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OPINIONS OF THE PRESS

ON

THE FIRST VOLUME

OF

DR. DOBELL'S REPORTS (1869).

"This is truly a valuable work, and Dr. Dobell will not only receive for it the thanks of the physicians of his own country, but of those of all other countries. Every scientific fact of interest in medicine that has been brought out by the researches of the learned in the profession is here noted."—*Cincinnati Medical Repertory*, April.

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NOTICE TO CONTRIBUTORS.

THE Editor begs to remind Contributors that to insure insertion, all matter *ought to reach him before the end of September.*

In future, no communication can be published that arrives later than November 1st.

and independent Reports, and the reader cannot fail to derive both pleasure and profit from its perusal."—*Mechanical Appliances*, Instruments, and Inventions in Different parts of the World. Report by HEATHER BIGG. "Mr. Bigg fills 50 pages with a long list and a short description of the infinite variety of instruments and appliances invented by different persons in different parts of the world."—*Portugal.* "There is much interesting matter in this report. Well entitled to be considered original and independent."—*British and Foreign Medico-Chirurgical Review*, October.

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"The labour voluntarily taken upon himself by Dr. Dobell, in the production of this work must have been immense; it is highly valuable and abundant in interest. As a commencement of what is possible in future years it is very encouraging. We are all too apt to go on working in limited circles, forgetting that our own circle does not comprehend all the world's area, and that important scientific problems are being worked out in places the very name of which conveys the idea of almost inaccessible remoteness. The wonder is that Dr. Dobell and his coadjutors have got together so much that is valuable. The cost in correspondence must have been very large indeed. The compilers, throughout the whole work, are worthy of both congratulation and thanks for the real enthusiasm which first prompted them to undertake such a labour, and for the conscientiousness with which they have carried it out."—*Australian Medical Journal*, September.

LONGMANS, GREEN, and CO., Paternoster Row.

DR. DOBELL'S REPORTS

ON

THE PROGRESS

OF

PRACTICAL & SCIENTIFIC MEDICINE,

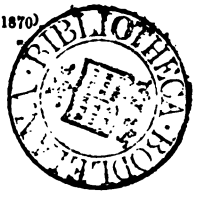
IN

DIFFERENT PARTS OF THE WORLD;

CONTRIBUTED BY NUMEROUS AND DISTINGUISHED COADJUTORS.

VOL. II.

FOR THE YEAR 1870 (FROM JUNE, 1869, TO JUNE, 1870).



"Summum crede nefas animam præferre pudori,
Et propter vitam vivendi perdere causas."—*Juvenal.*

"I hold every man a debtor to his profession."—*Bacon.*

LONDON:

LONGMANS, GREEN, READER & DYER.

1871.

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PREFACE.

My first and most pleasant duty in presenting this Second Volume of Reports to the profession, is, to return my warmest and most sincere thanks to my coadjutors for the large mass of valuable work which they so punctually placed at my disposal.

At any other time it might be invidious to point out one contributor for special mention, but I feel sure that, under the peculiar circumstances of this eventful year, all my coadjutors will join with me in offering special thanks to Professor Villemin, who, with the Hospital of Val de Grâce full of wounded and surrounded by every kind of distraction, punctually performed his promised task, and safely transmitted his Report for the benefit of his profession.

In the next place I wish to express my hearty thanks for the Reviews of my Reports, which have appeared in so many journals at home and abroad. I fully appreciate the consideration shown, almost without exception, for the unavoidable imperfections of the first number of so difficult a work, the warm approbation of the scheme of my Reports so generally expressed, and the many good wishes for their success.

I have endeavoured to profit by such suggestions as have been offered, but I must still ask my critics for consideration. It is not even in its second year that so large a scheme can be fully developed, and in the present Volume they will find that much remains to be done before the work comes up either to their expectations or to my design.

Some misapprehension appears to have arisen as to the

meaning of my announcement that "the object of this work is to bring together in the English language original and independent Reports from all parts of the world." It seems to have been thought that Reports from *all* parts of the world would be contained in *each* Volume. This would obviously be impossible. If the principal centres of civilisation are represented annually, and other parts of the world from time to time when there is anything like progress to report, I shall feel that I am fully carrying out the advertised objects of the work.

Again, I must remind those who appear to have thought that the terms "original and independent" precluded the introduction of abstracts of matter already printed in books, papers, and journals, that in such countries as England, France and Germany, almost everything worthy of the name of medical progress sees the light in print in the course of each year, and must be abstracted in any Reports pretending to represent the progress of those parts of the world.

HORACE DOBELL, M.D.

84, HARLEY STREET, LONDON.
January, 1871.

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*** As it is impossible to regulate the order in which Reports arrive from different parts of the World, it has been found impracticable to arrange them systematically without sacrificing punctuality in the appearance of the annual volume.

Therefore, to secure at once punctuality in publication and facility of reference, the Reports of Countries have been put to press as they arrived, and the following Alphabetical Contents is given, to show the page at which each Report is to be found.

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CORRIGENDA.

Page 6, line 14 and 40, *for* Montegazza, *read* Mantegazza.
„ 56, „ 37 and note, *for* Lanceraux, *read* Lancereaux.
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„ 111, „ 27, *for* Pettinkoffer, *read* Pettenkofer.
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„ 287, „ 29, *for* Wilkes, *read* Wilks.
„ 321, „ 37, *for* Foussagrinès, *read* Fonssagrives
„ 402, note †, *for* atheise, *read* atreia.
„ 430, line 27, *for* Ainstie, *read* Anstie.
„ 442, „ 11, *for* Forster *read* Foster.

REPORTS

ON THE PROGRESS OF MEDICINE

IN DIFFERENT PARTS OF THE WORLD.

*** The Editor does not consider himself responsible for the statements and opinions of his Coadjutors.

FRANCE.

Report by Professor Villemin, *Val-de-Grâce.*

Translated by Dr. Ireland (*of Fisherrow*).

The scientific tendencies, indicated by us in our last report, have been followed out during the course of the present year, and it is on the field of experiment that the most active medical researches have been prosecuted. Whatever be the way in which the solution of the different problems of the healing art are carried on, truth always adds something valuable to our acquired knowledge. Such additions are not all equally applicable to purposes of direct utility, and there is some danger of our turning away from the facts and methods of examination, which do not appear to lead to the end hoped for by the medical practitioner. But as the horizon of our knowledge becomes wider, narrow views such as these disappear. This ensures to the physician of succeeding times a good position both in the hierarchy of the sciences and in the social scale.

Anatomy and Physiology.

In an examination of the veins of the bladder, M. Gillette calls attention to the large number of veins possessed by that organ.* He divides them into:—1. the mucous net-work; 2. the intermuscular or subperitoneal net-work.

* Gillette: Recherches anatomiques sur les veines de la vessie et sur les plexus veineux intrapelviens. ("Journal de l'Anatomie," 1869.)

He points out that the mucous net-work, which has not been described until now in the best works on the subject, consists of a considerable number of veins, and can be easily injected through the vena dorsalis penis. All the subperitoneal veins offer numerous arching anastomoses. The two first anterior arches are in some sort represented by the bifurcation of the vena dorsalis penis, and as these two branches are always of considerable size, puncture of the bladder below the symphysis pubis, as recommended by M. Vaillemier, does not seem to be entirely free from danger of hæmorrhage.

Under the name of the pelvi-perineal venous plexus, M. Gillette groups together all the venous plexuses of the pelvis, which inosculate freely with one another, and participate in a passive form in those phenomena of congestion to which the organs within the true pelvis are subject.

According to M. Gillette there are few lymphatics, though there are many veins, in the mucous coat of the bladder, and in those special conditions in which absorption takes place from the surface of the organ, it is through the veins that it is conducted.

The state of our information about the connective tissue is somewhat different since Virchow pointed out the existence of a cellular element in it. Every one knows the views of the Berlin Professor upon the disposition and function of the plasmatic cells in the physiological and pathological operation of the connective tissue. The plasmatic cells, anastomosing with one another, are assumed to form a tubular net-work, through which is conducted the circulation of the serum of the blood. These plasmatic cells form at the same time the commencement of all the neoplasms arising from the connective tissue. M. Ranvier,* in a memoir upon the cellular elements in the tendons and loose areolar tissue, brings forward facts, tending greatly to modify the anatomical description of Virchow. That part of M. Ranvier's work, relating to the tendons, has already been noticed in last year's report. We shall, therefore, confine ourselves to the loose connective tissue.

According to M. Ranvier, the pretended anastomosing plasmatic cells are merely the result of sections made upon dried specimens. But while we reject this mode of preparation as defective, we must not think of replacing it by macerating the tissue in water; in separating it with needles, the fibres are confused together, and

* Ranvier: Des éléments cellulaires des tendons et du tissu conjonctif lâche (tissu cellulaire). ("Archives de Physiologie," 1869.)

the cells, swollen or broken down, are concealed by the interlacing fibrils.

To avoid all these inconveniences, M. Ranvier has had recourse to another method. By means of one of Pravaz's syringes he injects either gelatine at the temperature of 37° C., or a solution of nitrate of silver (one part to a thousand), or simply so much serum. This injection must be made on an animal newly killed, and before the body has cooled.

An artificial œdema is produced. If the injection be slowly made, and the part be rubbed at the same moment, the injected matter diffuses itself around the structure which composes the connective issue.

Injections of gelatine become solid whenever the bodily heat disappears. Sections may then be made, showing the different parts of the connective tissue kept separate from each other by this new contrivance.

The stellate figures (plasmatic cells) are no longer observed, nor can we render them visible either by the use of carmine or the action of acetic acid.

We notice upon the preparations:—1. Bundles of white connecting filaments, some cut across, others cut obliquely or longitudinally. 2. Cells either spindle shaped, or resembling those of the layers of a scaly epithelium. 3. Cells of a rounded or irregular form. Yellow elastic fibres may be also seen on those preparations; they are either straight or slightly curved.

In order to have a good view of the cells, and observe their connections, nitrate of silver should be added to the gelatine, as practised by Chrzonszewky (gelatine one-half, nitrate of silver, in solution—two to the thousand—one-half). Viewed in profile these cells appear spindle-shaped, with rod-like nuclei. Some of the cells have prolongations, which may be observed, though not often, to stand in contact with similar prolongations of neighbouring cells. The flat cells are but feebly united to the bundles of connective fibres, while the round and irregular cells lie quite free in the spaces between the filaments.

We can also get good preparations by injecting a solution of the nitrate of silver (one part to the thousand). Sections, practised with curved scissors, are placed upon the object glass, treated with picro-carminate of ammonia, and preserved in glycerine acidulated with formic acid.

From the facts given in his memoir, M. Ranvier draws the following conclusions:—

1. Connective tissue is composed of white filaments, elastic fibres,

and cells. There are neither laminæ nor openings observable. The expressions laminar tissue and cribriform tissue are, therefore, objectionable.

2. The bundles of connective fibres are cylindrical, and bounded by a special layer, a species of membrane made up of annular and spiral fibres closely cohering.

3. All the cells observed in the connective tissue are formed out of a granular protoplasm. They contain well-formed nuclei. Some of these cells are flat, presenting an irregular contour and even prolongations; sometimes they are doubled up. Their nuclei are of an oval shape, and very flat; they contain one or two well-formed nucleoli; more rarely the cells are globular, or irregular with spherical nuclei. Some of these nuclei are not distinguishable from the white corpuscles of the blood.

4. These different cells are placed between the bundles of fibres, to which, however, they have not all the same relations: whilst the globular cells appear to circulate easily in the spaces left between the bundles, the flat cells lie along them, and do not change place so readily.

The stellate figures (plasmatic cells) are nothing else than the meshes of the net-work of the bundles of fibres. We do not say that there is no plasmatic circulation in the connective tissue. There is probably a circulation round the connective bundles in the highly dilatable spaces which they leave. The presence of cells similar to the white corpuscles of the blood, or to those of the lymph, leads one to think with Recklinghausen that the plasmatic circulation is a true circulation of lymph. Besides, the existence in the subcutaneous areolar tissue of these flat cells, lying on the surface of the bundles, inclines us to regard the connective tissue as a vast enclosed space, analogous to the serous cavities.

But it must be kept in mind, that if the cells of the connective tissue have not the form and relations which Virchow assigns to them, this illustrious savant has still the great merit of establishing their existence and significance in pathological changes.

The effects of section of the pneumogastric nerve upon the rhythm of respiration have been long known, which is not the case with the effects following excitement of the same nerve. Traube and Claude Bernard have simultaneously remarked the arrest of respiration caused by exciting the central termination of the pneumogastric. The stoppage of respiration, according to them, always took place during the act of inspiration, and the respiratory movements reappeared during the continuance of the electro-

magnetic excitation. Eckhard and Budge, on the other hand, maintained that the stoppage of respiration on excitement of the vagus nerve took place during the action of expiration.

Rosenthal tried to throw light on this question. Not satisfied with former methods of observation, he conceived an apparatus to which he gave the name of phrenograph, in order to enable the senses to appreciate the movements of the diaphragm, for it was on the nature of these movements that the controversy turned. He found that he produced effects of an opposite character when he galvanised the pneumogastric, or when he acted upon the superior laryngeal branch alone. Thus he was led to admit a functional antagonism between these two nerves, and this antagonism is of great significance in the theory of the rhythm of the acts of respiration. According to Rosenthal, when the pneumogastric is strongly excited, the muscles of inspiration enter into a state of tetanic contraction, whilst the expiratory muscles are paralysed. An energetic stimulus applied to the central termination of the superior laryngeal, on the other hand, paralysed the diaphragm, and threw the muscles of expiration into a state of permanent rigidity.

M. Bert* taking up this question, still full of contradictory facts, arrives at the following conclusions:—

1. Respiration may be arrested by exciting the pneumogastric nerve (Traube); by exciting the nerves of the larynx (Claude Bernard); by exciting those of the nostrils (Schiff); by exciting most of the nerves of sensibility (Schiff), an assertion which I cannot confirm.

2. The stoppage of respiration may take place either during the act of inspiration or of expiration through any one of the above-mentioned nerves; nor have we a right to suppose that this is due to the electric current passing to different nerves instead of acting upon them separately.

3. A weak excitement accelerates, a strong one slackens respiration, while a very powerful one stops it altogether. Of course strong and weak are comparative terms; what is strong for one animal may be weak for another.

I believe, against the opinion of Rosenthal, that section of the pneumogastric does not increase the difficulty of arresting the respiration; at least, death may be more easily produced by exciting the nerves after such a section than before it.

* Paul Bert: Des effets de l'excitation du nerf pneumogastrique, du nerf laryngé superieur, et du nerf nasal sur la respiration. ("Archives de Physiologie," 1869.)

4. When the respiratory movements are completely arrested the general movements of the animal also cease.

5. Respiration may return during the excitation, and when the stimulus is suspended the breathing almost always becomes accelerated.

6. It is more easy to cause a stoppage of expiration than one of inspiration. In some cases inspiration cannot be stopped at all.

7. If we employ an excitement sufficiently strong to arrest the inspiration, we can cause the respiratory movements to cease instantaneously. This may be accomplished either by acting on the vagus or on the superior laryngeal.

Bearing these conclusions in mind let us now consider the effect of pain upon respiration. Montegazza has just published a very interesting work upon this subject, which shows that a slightly painful stimulus increases the number of the respiratory movements, whilst a very painful stimulus diminishes them.

We cannot attribute the effects of excitation of the pneumogastric superior laryngeal and nasal branches of the infra-orbital nerve to the action of pain. The vagus is not very sensitive to pain, and etherisation does not hinder the excitement of these nerves from affecting the respiration. In using the words pain and sensibility we signify a peculiar manifestation of the centripetal action of the nerves, a manifestation corresponding with the function of the nervous centres with which the nerves are continuous. But the nerves of the respiratory tract, those branches of the vagus distributed to the lungs, the superior laryngeal, and the nasal nerves which preside over the orifices of the air-passages are in direct functional relation with the nervous centres of respiration.

Impressions made upon the other sensory nerves have only indirect relations with this centre of respiration, and the emotions which act entirely through the cerebrum may cause its functional manifestations to become slower, but cannot completely arrest them.

To sum up, our experiments lead us to reject the relation which Rosenthal wished to establish between the muscles of inspiration and the pneumogastric on the one side, and the muscles of expiration and the superior laryngeal nerve on the other. Putting together the experiments of Schiff and Montegazza, we arrive at the following formula:—

Every feeble excitement of the centripetal nerves increases the frequency of the respiratory movements; every strong excitement

diminishes them. A strong excitement of the vagus, of the superior laryngeal, and of the nasal branches of the infra-orbital nerve may completely arrest respiration.

If the excitement is sufficiently energetic, the stoppage takes place the very moment the stimulus is applied. A very powerful impression transmitted to the respiratory centre may cause the sudden death of the animal under experiment. These remarks apply to mammalia, birds and reptiles.

Most physiologists have hitherto regarded the trachea simply as a tube through which the air passes to and from the lungs; nevertheless sudden death has been frequently observed both in tracheotomy and after fractures of the larynx, without any physiological explanation to account for the unfortunate event.

The truth is the trachea is not an inert air-tube, but has an intimate functional connection with the medulla oblongata through the vagus nerve. The oxygen of the air excites in an intermittent manner the extremities of the vagus nerve, and keeps the medulla oblongata in a constant state of activity. M. Leven* tries to demonstrate this view by his physiological researches. His conclusions are as follows:—

1. A ligature passed around the trachea, and narrowing its calibre, without preventing the exchange of gases in respiration, immediately causes the respiratory movements to become slower.

2. A strong ligature drawn round the trachea so as to close the passage puts an end at once to the functions of respiration and circulation, and immediately causes death, which is only preceded by two or three convulsive shocks.

3. Through the agency of the pneumogastric nerves impressions made on the trachea are transmitted to the medulla oblongata.

4. The proof of this can be made by cutting the pneumogastric nerves before tying the trachea; a ligature cannot then produce sudden death. The animal dies asphyxiated.

5. When the animal is reduced to a state of coma resulting from the presence of an excess of carbonic acid in the blood, produced by narrowing the calibre of the trachea by means of a ligature, the respiratory movements may still be rendered less frequent by tightening the ligature, or death may be brought on at once by abruptly occluding the windpipe.

6. These experiments have a direct bearing upon asphyxia, and on different pathological phenomena.

* Leven: Des fonctions de la trachée dans l'acte de la respiration. ("Archives de Physiologie," 1870.)

7. It would be a mistake to confound asphyxia produced by carbonic acid with the asphyxia of strangulation and submersion, since these three conditions arise from distinct causes.

8. Death by the asphyxia of strangulation or of submersion may be assisted by an excess of carbonic acid in the blood. This, however, is a secondary and exceptional cause.

9. Death from strangulation results from compression of the trachea, and excitement of the vagus following on irritation of the medulla oblongata.

10. In death by submersion the trachea no longer receives the oxygen of the air, the vagus is no longer stimulated, the medulla oblongata remains inactive, and life is suspended through the stoppage of the circulation and respiration after the animal has made three or four respirations stimulated by the oxygen still left in the bronchi.

11. Asphyxia by strangulation and submersion ought thus rather to be called syncope, if these two terms are not to be confounded with one another. Many cases hitherto regarded as asphyxias are, in truth, distinct varieties of syncope. Asphyxia by strangulation is due to an irritation of the medulla oblongata; asphyxia by submersion is due to inactivity of the same organ.

The lachrymal sac has been generally treated as an appendage of the eye, and the secretion of tears as intimately associated with the function of vision. M. Bergeon* considers the lachrymal apparatus as having a close relation to the function of respiration, and in support of this view he advances some considerations drawn from comparative anatomy and pathology.

The lachrymal glands, whose secretion always passes into the nostrils, are met with even in the Ophidia, although the eyes of those reptiles, protected by the translucent continuation of the skin over the conjunctiva, are not liable to be affected by evaporation. On the other hand, it is only animals like the Cetacea breathing an air saturated with moisture that have no lachrymal glands. The lachrymal apparatus in the Zemni and the Spalax is a hundred times larger than the eyeball, with whose development it has no correspondence. The secretion of the lachrymal glands helps to lubricate the air-passages, whilst the air passing down the nostrils assists the lachrymal secretion in its progress through the winding, and, in some places, narrowed conduit of the nasal duct.

* Bergeon: Rôle de la glande lachrymale, dans la respiration. ("Comptes rendus de l'Institut," 1870.)

Owing to the structure of the lower opening of the nasal duct, which, always narrow, is sometimes contracted to a capillary minuteness, the lachrymal secretion is hoarded up in the nasal duct, within the lachrymal sac, the canaliculi and the orbital space below the level of the canthi of the lower eyelids. The tears thus form a slender column of fluid, extending from the canaliculi to the lower extremity of the nasal duct.

Passing rapidly across this orifice the inspired air carries with it, in the form of vapour, the lachrymal secretion which oozes out upon the mucous surface, and thus brings about, by a mechanical arrangement similar to that of some spray producers, a real suction of the column of tears. This suction acts upon the lachrymal gland, and excites its secretion.

It is the want of this stimulus which causes the secretion of tears to diminish when the lachrymal sac is destroyed, and explains why epiphora does not occur after the operation of obliteration of the sac. When the tears no longer reach the mucous membrane of the nostrils patients complain of dryness and uneasiness in the nose.

The tears incessantly attracted into the nasal fossæ by the action of respiration not only keep these mucous surfaces moist, but help to communicate to the inspired air that degree of humidity necessary to the exchange of gases within the air-cells. In these two ways the lachrymal glands may be regarded as useful auxiliaries to the process of respiration. They are, at the same time, the principal sources of the moisture of the nasal passages.

Though the rapidity of absorption possessed by the lungs is well known, their power to take up toxic gases had not been subjected to rigorous experiment until M. Gréhant* delivered an interesting communication on this subject to the Academy of Sciences. He has tried to show the rapidity with which oxide of carbon is absorbed by the lungs by analysing the gases of the blood.

From experiments made upon dogs the author has proved that when an animal has breathed air containing one-tenth part of oxide of carbon, a mixture dangerous to life, for from ten to twenty-five seconds, the arterial blood contains 4 per cent. of oxide of carbon, and less oxygen than normal blood (14.6 per cent.). After between seventy-five and ninety seconds, oxide of carbon is

* Gréhant: Sur la rapidité de l'absorption de l'oxyde de carbone par le poumon." ("Comptes rendus de l'Académie des Sciences," 1870.)

found as high as 18.4 per cent, whilst oxygen is now as low as 4 per cent.

These results are, as M. Gréhant has remarked, directly applicable to man. If a person enters a place strongly charged with this gas, the poison pervades the arterial blood in a single minute, and comes in contact with the tissues, which it deprives of life. Before entering a well, cave, or passage where the air has not been renewed for some time, the workmen ought to send in a cage containing a bird, or small mammal, such as a rat or guinea-pig. If the creature does not suffer inconvenience in ten or fifteen minutes, the man may safely follow; if the animal perishes, the place ought to be thoroughly ventilated, nor should any one enter until a similar experiment has been tried without injury to the animal. In this way fatal accidents may be prevented.

In a series of memoirs, the first of which appeared in 1867, and the last in February, 1870, M. Becquerel * has made known some interesting facts relating to electric currents in the human body. M. Becquerel rests his deductions on the principle that two solutions of different composition, both conductors of electricity and separated from each other by an organised membrane, or by a capillary wall, constitute an electro-chemical circle, which may be the cause of chemical changes.

M. Becquerel has succeeded without any difficulty in decomposing solutions of the salts of platinum, gold, silver, copper, tin, lead and cobalt, &c., simply by keeping them separated from one another by means of a glass tube with a slight crack in it, or by filtering-paper.

It would appear from this that electro-chemical circuits can exist in organised bodies without metallic plates. The presence of two liquids separated by the walls of capillaries or by membranes is sufficient to constitute a circuit.

The electro-capillary circuit is produced in this way. The outer surface of the capillary wall in contact with the solution, which is an acid fluid, is the negative pole, the inner surface is the positive pole, the intervening capillary wall acts as a solid conductor of electricity.

Electro-capillary currents produce important mechanical effects. We know that there is a double current flowing from the two poles;

* Becquerel: Des phénoménes electro-capillaires ("Comptes rendus des Séances de l'Académie des Sciences, 1867 à 1870.")—Analyse par M. Onimus dans "Journal de l'Anatomie," 1870.

that flowing from the negative pole is much feebler than that flowing from the positive pole.

Thus, in decomposing with the voltaic pile water separated into two compartments by means of a membrane, the level of the fluid remains higher on that side of the compartment next the negative pole. In some other respects positive electricity can be shown to have more power than negative electricity.

If we now consider the different structures of an organism, such as cells, tubes, and globules, in their relation to organic fluids, we find almost everywhere the principle of the electro-capillary pair, that is to say, fluid, or semi-fluid substances, separated from each other by a membrane giving rise within the same tissue to countless currents of electricity which act unceasingly during life, and sometimes after death.

In his first series of experiments M. Becquerel has demonstrated: 1. That a muscle uninjured put in contact with oxygen respires just as when it was supplied with blood, though the consequences are not exactly the same. 2. That when the muscle is disorganised and reduced to a fine pulp it consumes quite as much oxygen as an uninjured muscle of the same weight.

Now, if we take a muscle, whether mashed or unmashed, put a plate of platinum on the outside, and introduce another plate within it, we obtain a deviation of the galvano-metric needle. This indicates that the current flows from the interior to the exterior, in other words, that the outer surface is positive and the inner surface negative. As the outer surface is in contact with the atmosphere, and therefore more exposed to oxidation, we may infer that oxidation is one of the causes which determine the muscular current.

M. Becquerel has also shown from experiments on the absorption of gas by the bones and tendons that these tissues respire like muscles. He agrees with Hermann that the origin of electrical currents in the muscles is due to a chemical cause.

M. Becquerel adds some new proofs of this view which, however, had been already established by experiments upon muscles reduced to pulp. If we set a going an electric current from the interior of a muscle to the exterior, and then plunge it into a medium charged with nitrogen or hydrogen gas, after a while the current slackens, then ceases, and at last sets in in the opposite direction. This change of direction is probably due to the difference of oxidation in different parts of the muscle; the inside still containing some oxygen, and remaining oxidisable, becomes acid in relation to the outside, whose surface is now completely altered.

M. Becquerel has determined the electro-motor force of the osseous current with the aid of the electrical resistance method, and employing special pairs of metals invented by himself. This force is about half the strength of a battery with a single pair and sulphate of copper in solution; it is constant for some time, then gradually increases in strength as the distilled water in which the bone is immersed becomes charged with organic matters, which in decomposing render the water acid. A pile may thus be constructed which continues to act for several weeks.

M. Becquerel has endeavoured to ascertain the degree of electro-motor force between the arterial and venous blood. He has found that it is equal to 0·57, that of a battery of a single pair with nitric acid being 100. The electro-motor force of the serous matter in muscles is represented by 0·3. There are innumerable electro-capillary currents passing between the blood and the fluids within the muscles. He thinks that there also exists an electric current in the brain and spinal cord passing from the white to the grey matter.

M. Becquerel explains in the following way the electro-chemical actions occasioned by these innumerable electro-capillary pairs. In the arterial blood the oxygen is held by the hæmatosin through a capillary affinity. The surface of the capillaries in contact with the arterial blood forms the negative pole; the outer surface of the capillary wall in contact with the serous juice of the muscles represents the positive pole. The electric currents may be strong enough to overcome the resistance of every affinity, even that of the capillary affinity. The oxygen of the blood under the influence of the electro-capillary current acting as a chemical force seeks the positive pole which is on the outside of the capillary walls, while the globules which are electro-positive remain on the negative side, that is, still within the capillaries. The oxygen is now free to act upon the combustible matters of the surrounding fluids, producing carbonic acid gas, which is attracted into the capillaries by the *vis a tergo* action of the current driving along the electro-positive matter still remaining within the vascular walls.

M. Becquerel's theory also applies to the capillaries of the lungs, but the phenomena are inverted. Here it is the carbonic acid which is expelled, and the oxygen which enters the blood of the efferent vessels. The positive and negative electricity has likewise changed sides of the capillary walls. The oxygen is no longer within the capillaries as in the tissues, but within the air cells. The phenomena of exchange and transport are thus completely reversed.

Several experiments go to prove that the oxygen in the blood going to the heart from the lungs is in the state of ozone, a change which can only have taken place after having been submitted to the influence of electric currents in the pulmonary capillaries. The walls of the tissues which serve as electrodes to the electric capillary pairs are themselves under the influence of electro-chemical forces; they are decomposed and renewed. Thus the tissues are in a state of perpetual change.

To sum up, electric currents of the same kind and from the same conditions arise in the tendons, the arteries, the veins, the nerves, the bones, and all the tissues. These currents have a chemical origin, and do not arise from any special electrical organisation of the muscles and of the nerves.

Electro-capillary currents, the only electric currents whose existence is established, are produced in living bodies wherever there are two liquids of different reactions separated by a membrane, such as a cell wall. The electricity generated in the special apparatus of certain fishes is probably produced in a similar manner.

It is difficult to admit that the absorption of light by the choroid is indispensable to correct vision when we know that in most animals the choroid has a lustrous surface, and that even in man, as we observe every day through the ophthalmoscope, the light entering the posterior chamber of the eye is never entirely absorbed. It may be asked whether this unabsorbed light thrown back upon the retina from behind is not useful instead of injurious to vision.

M. Victor Bravais * has tried to explain this difficulty, and to reconcile the apparent contradiction of the facts in point.

As the author remarks, correct vision can only exist with *clear images* on the retina; but images formed by direct rays may retain their clearness even when reflected, if every reflected ray recrosses the retina exactly where it has already traversed it. This condition is fulfilled wherever the reflecting surface is in contact with the *sensitive screen*. Every ray of light which has traversed one of the cones or rods of the columnar layer of the retina being stopped and reflected by the choroid can only return by again permeating the same sensitive structure, thus *increasing* the impression without diminishing the clearness of the image. Such is the case with the eye in those animals in which the *tapetum* exists, and also in the normal human eye which stops and reflects the light by its pig-

* Victor Bravais: "Du rôle de la choroïde dans la vision." Paris, 1869.

mentary layer lying behind the rods of Jacob. In both cases the light is reflected in a manner which may serve to render it useful to vision.

The case is different when the rays of light, no longer reflected by the layer immediately behind the retina, are reflected from a greater distance, from the sclerotic, for example, as happens in albinos and old people, where the choroid is deficient in pigmentary matter. The confusion of vision which results is not owing to the *quantity* of rays reflected, but to the *defective manner* in which they are reflected.

The light which has passed through one of the cones or rods of the retina not being turned back by the pigmentary layer passes on to the sclerotic, from which it is reflected in a diffused manner upon several cones or rods instead of upon one. The image being thus refracted, vision is rendered less distinct.

If we take into consideration the effects on vision, we must not confound those reflections of light, however diffuse, which are made from *the anterior surface of the choroid* (the epithelial pigmentary layer of the human eye, or the fibrous layer of the *tapetum* in animals) with the irregular reflection made in albinos and some old people from the posterior layer of the choroid, and from the sclerotic. The first of these reflections is favourable to vision; the second detrimental.

As the eye in albinos and the aged cannot be compared with the eye of those animals possessing a lustrous *tapetum*, the principal argument upon which the theory of absorption reposes is utterly worthless.

For a number of years the question of the reproduction of bone has been much studied in France. To convince ourselves of this we have only to recall the labours of MM. Sedillot, Ollier, and others. The experiments which M. Goujon * has made upon the marrow (*medulla ossium*) are worthy of attention. He has taken portions of marrow from the femur of a rabbit and has transplanted them into one of the muscles of the same animal, either by subintegumental or by free incision. He has also taken several cylinders of marrow from the ulna and radius of a fowl and inserted them in the pectoral muscles of other fowls.

In both cases the pieces of marrow, transplanted into a medium

* Goujon: Recherches experimentales sur les propriétés physiologiques de la moëlle des os. ("Journal de l'Anatomie," 1869.)

rich in vessels, have become grafted into the surrounding tissues and given birth to osseous productions.

These experiments confirm the part already conceded to the marrow in the formation of callus.

Here is a *resumé* of the author's conclusions:—

1. I have been the first to show that the marrow may be engrafted and give birth to osseous productions.

2. The periosteum and some of the cartilages can no longer be regarded as the only tissues which carry with them the organic conditions necessary for the production of bone.

3. The marrow may be easily engrafted with success, but does not always give origin to osseous productions. The younger the marrow, and the more vascular the tissue into which it has been transplanted, the more chance is there of bone being produced.

4. The bone resulting from the transplanted marrow finally becomes absorbed. One must not then wait too long before examining the place.

5. The reproduction of a portion of bone artificially removed may occur even when the periosteum has been taken away.

6. The marrow is indispensable to osseous reparation; in the formation of callus in particular it no doubt plays the most active part.

MM. Béchamp and Ester,* in some researches on the microzymas of the blood, and on the nature of fibrin, points out that the coagulation of the blood is due to the juxtaposition and agglutination of minute globules (not the blood-corpuscles), and that these globules are microzymas, and are capable of effecting the saccharification of starch.

In an elaborate paper comparing the saline constituents of the grease in sheep's wool and those of human perspiration, M. Cloëz† refers to the patent of M. Evrard for extracting carbonate of potash from the grease of sheep's wool, a process now worked on a large scale. MM. Maumêne and Rogelet asserted that the pure grease of sheep's wool was devoid of soda or salts of that alkali. M. Cloëz maintains that salts of soda are present, although to a very much smaller extent than sodium salts. The following is one of numerous analyses of the saline constituents of this material

* MM. Béchamp and Ester. ("Comptes Rendus des Séances de l'Académie des Sciences," September 20th, 1869.)

† M. S. Cloëz. ("Bulletin Mensuel de la Société Chimique de Paris," July, 1869.)

given by the author:—Carbonate of Potash, 84·8; Sulphate of Soda, 4·65; Chloride of Sodium, 10·45. He then gives the analysis of the saline constituents of human perspiration, in which it will be noted that the potash salts seem to predominate over the soda salts—Carbonate of Potash, 31·82; Sulphate of Potash, 11·76; Chloride of Potassium, 16·02; Chloride of Sodium, 38·54.

M. Pollacci,* in a paper "On the Presence of Manganese in Milk and in Blood," points out the method he has adopted for demonstrating the existence of manganese in blood and milk, a circumstance that has been known to chemists for the last twenty-five years. The author has not as yet made any quantitative experiments, but remarks that milk contains more manganese than blood.

Pathology.

The mucous membrane of the mouth is the favourite seat of aphthæ. Wherever else these parasites are met with, one may be sure to find them there also. But though they are known to descend the pharynx and œsophagus, it was a debated question whether aphthæ were ever found below the cardiac orifice. Now, however, M. Parrot has put an end to all doubt on the subject.

In his memoir, M. Parrot † gives eight observations which prove that the spores of aphthæ may germinate in the stomach, and fix themselves on its walls like a vegetable upon the soil.

On opening the stomach the lesion caused by aphthæ is generally easily recognisable, but sometimes it is covered by a thick and tenacious mucous matter. It is only after having removed this layer of mucous matter, either by slightly scraping it, or by directing a jet of water upon it, that one can examine the underlying fungous deposit.

The aphthæ appear under the form of little eminences, sometimes isolated, sometimes close to one another, and grouped in some points into spots rising above the surface, of variable size, but none of them bigger than a millet seed. Their nature may always be readily distinguished. The smaller spots are acuminated; the largest have in the middle an umbilicated depression resembling the commencing eruption of tinea favosa.

Their favourite seat is the posterior surface of the stomach, where they are grouped near the curvatures, especially the smaller

* E. Pollacci: "Journal de Pharmacie et de Chimie," May 1870.

† Parrot: Du muguet gastrique et de quelques autres localisations de ces parasites. ("Archives de Physiologie," 1869.)

one, and nearer to the cardiac than the pyloric orifice. They adhere closely to the mucous membrane, from which they cannot be separated either by laving water upon them, or by scraping.

This lesion differs in appearance from those produced by the oïdium albicans in the upper part of the digestive tube, and if it were not for the presence of numerous marks of thrush in the mouth, pharynx, and œsophagus, one would never suspect that these minute elevations in the mucous lining of the stomach were really a collection of fungi. The use of the microscope is clearly indispensable; by its aid we discover a great number of elongated cells and spores identical with those of the oïdium albicans.

To have an exact idea of the lesion it is necessary to make sections of the stomach hardened either by drying or by a prolonged maceration in alcohol. At a low power we see cones, deeper in colour than the neighbouring parts, rise above the ordinary surface of the mucous membrane, in whose wall they are implanted.

By the use of a higher power these little elevations are made out to be composed of myriads of spores heaped upon one another with filaments interlacing in all directions.

In some points the glandular layer is traversed by the filaments of the fungus, which do not always stop there, for they may sometimes be traced beneath the mucous coat. They dip into the mucous surface like the rootlets of a plant running along and compressing the vessels. The tissues in which the oïdium grows are more or less altered, sometimes even completely destroyed; as the fungus prevents their nutrition, and absorbs their substance for its own profit.

In one case M. Parrot observed that the aphthæ, in place of taking root in different points of the coat of the stomach, extended their lines on the surface of the mucous membrane, losing in depth what they gained in breadth. M. Parrot supposes that this might have been owing to the action of bismuth which the patient had been taking.

The symptoms caused by aphthæ in the stomach are not yet known. It is common for children to refuse food, to have vomiting, diarrhœa, sinking of the temperature, rapid and progressive emaciation, and when the stomach is examined no trace of vegetable parasites can be found. But if such symptoms exist in children who have for some time suffered from confluent thrush in the mouth and pharynx, we may suspect its existence in the stomach. It is probable that the disease is propagated by the germs which descend with the food from the mouth and throat.

M. Parrot regards thrush as a secondary disease, resulting from previous disorders in the digestive organs, and never as an original malady. The deterioration of the organism must have already been far advanced when so active an organ as the stomach becomes inert enough to suffer a parasitic vegetation to grow upon its walls. Everything, indeed, about the stomach seems to render it unfit to become the nidus even of the most tenacious and fertile of vegetable parasites. When it does occur we may infer that medicine will do little to stop it.

Some authors have maintained the occurrence of aphthæ in the intestines below the stomach, though without any sufficient proof. M. Parrot, after numerous researches on children, has never observed the disease to pass the stomach.

In one case he has found the oïdium in the lungs. At the apex of the lung of a child he found some matter about the size of a small cherry-stone, bulging into the pleura, and not much harder than the surrounding parenchyma. On microscopic examination, this was found to consist of numerous spores and mycelium of the oïdium amongst the *débris* of the pulmonary tissue.

A species of ulcer or ulcerous tumour of the tongue has been met with in patients suffering from known or latent tubercle. These ulcers, pointed out by Baumes, Franck, and Bayle, have been described by Ricord, under the name of buccal phthisis. Ricord has taken some pains to distinguish them from syphilitic ulcers, and M. Julliard has written an important work upon them. M. Trélat* has collected some new facts, of which the following is a resumé, to elucidate the history of this disease :—

1. Those ulcers of the mouth which go under the name of buccal phthisis and of tubercular ulcers are, sometimes at least, produced by the ulceration of true tubercles—a fact not hitherto admitted.

2. It is always in people affected with tubercle that these ulcers occur; their appearance sometimes precedes, but more frequently follows, pulmonary tubercle.

3. The diagnosis of the ulcers cannot always be made out in all stages of the general disease.

The authors who have treated of the pathological alterations in the intestines attending typhoid fever, have principally confined themselves to the lesions in the glandules and follicles, passing over the changes in the villi, in the follicles of Lieberkühn and in the

* Trélat: Note sur l'ulcère tuberculeux de la bouche, et en particulier de la langue. ("Archives Générales de Medecine," 1870).

connective tissue. In treating of the lesions, M. Cornil* attributes an important part to hypertrophy in Peyer's glands and in the solitary glands.

To get preparations showing at one glance all the layers of the bowel at the same level with Peyer's glands, M. Cornil has stretched sections of intestines upon cork, and hardened them either in pure alcohol or picric acid. An examination of minute sections of these preparations have enabled him to make out the following details :—

1. The villi, in place of being long and separated from each other, become shorter and thicker, and their bases approach so near one another as to touch. This modification is owing to the infiltration of the tissue of the villi with minute round cells or lymph cells. Such is the shortening of the villi that the surface affected appears quite smooth.

2. The follicles of Lieberkühn become longer and broader the nearer they approach the diseased spots; in the neighbourhood of the raised spots they are from 0·07 to 0·09 millimetres, while on the surface of the spot itself they measure as much as from 0·25 to 0·40 millimetres in length. The differences in breadth are from 0·03 to 0·15 millimetres. The lesions in the villi and glandulæ are equally marked at Peyer's glands, and in the separate follicles.

3. The deep layer of the mucous membrane, which forms the greater portion of the hard patch, is traversed by vessels considerably dilated filled with globules, especially white corpuscles, in greater proportion than usual. This connective tissue is infiltrated with small round cells. If we squeeze the preparation previously hardened in picric acid we expel most of the lymph-cells lying in the interspaces, both of the gland structure itself and of the retiform connective tissue supporting the lymphatic follicles which constitutes the lower layer of the mucous membrane. The textures thus cleared of the loose elements they contain show large clear circular spaces, which, from the disposition of the central retiform connective tissue and condensed surrounding layers, allow us to recognise without any difficulty the lymphatic follicles. There may also be seen in the nodosities of the retiform tissue nuclei of an ovoid or rounded form and hypertrophied, as is observed in the neoplasms of leucocythæmia.

In an advanced stage of the disease there is a large number of free cells amongst the follicles, and the retiform connective tissue is

* Cornil: Sur l'histologie pathologique des lésions de l'intestin dans la fièvre typhoïde. ("Archives de Physiologie," 1870).

much destroyed. The follicles are transformed into little abscesses, the granular walls of which are infiltrated with lymph cells.

The retiform connective tissue surrounding the follicles is infiltrated with lymph or embryo cells. Now-a-days the complete identity of lymph cells, white corpuscles of the blood, and embryo cells is no longer denied.

The hypertrophied patches are formed by a proligeration of the adenoid tissue (villi, closed follicles, and deep glandular tissue) and of the connective tissue of the mucous membrane. The superficial tubular glands are also hypertrophied.

These lesions in typhoid fever resemble the lymphadenomata or glandular tumours met with in leucocythæmia, amongst which M. Cornil is inclined to class them.

4. Besides these lesions of the mucous coat, we sometimes find, especially when the glands of Peyer have become ulcerated, anatomical ulcerations of the muscular and peritoneal coats. Beside the diseased patch a small pale spot may be seen on the peritonæum. On examining it through the microscope, we see a number of embryo cells which diffuse themselves in the longitudinal layer of muscular fibres. These embryo cells may be also perceived heaped together in an amorphous plasma resembling tubercle, and only distinguished from it by presenting no distinct nodules.

We do not yet quite understand how sudden death takes place after effusions into the pleura. How do we know that the syncope which we assume to exist is always the proximate cause of death? M. Vallin * has published a case bearing on this question, of which the following is a short report:—

A young man, twenty-one years of age, and of previously good health, was seized with acute pleurisy followed by considerable effusion and marked displacement of the heart. The case was suddenly complicated by complete loss of sensation and movement, followed by aphasia and hemiplegia of the right side. The pleuritic effusion became purulent, and after paracentesis had been several times performed, the patient died at the end of the second month. At the autopsy there was found, besides the empyema, a softening of the matter of the inferior nucleus of the corpus striatum; and one of the branches of the middle cerebral artery was obliterated by a yellow clot evidently not of recent origin. The smaller branches of the obliterated artery ran in the

* Vallin: De l'Apoplexie dans les épanchements de la Plèvre. ("Union Medicale," 1870.)

direction of the island of Reil, and a stylet pushed in that direction found its way to the very centre of the softened grey matter. There was no lesion either of the valves of the heart, of the aorta, or of the great arteries; and we are led to enquire whether some small clot might not have been formed in a corner of the auricle, or in one of the pulmonary veins, compressed by the pleuritic effusion, and afterwards detached by an effort of coughing and launched into the general arterial circulation. What makes it appear probable that this *ramollissement* was owing to an embolism, is that, some days after the apoplectic attack, the patient had on the sole of the right foot a large eschar involving the whole thickness of the skin, and which became slowly detached by suppuration. It does not seem unreasonable to explain in this way some cases at least of sudden death in pleurisy. When death in this disease is not preceded by a short period of asphyxia, it is attributed to syncope—a word which covers our failure to find on dissection any lesion sufficient to explain the sudden death. In the foregoing case if the apoplectic attack had at once resulted in death, it would have been put down to syncope, and the lesion in the brain would have been, no doubt, overlooked; for unless life continues some time after the obliteration of the vessel, the parenchyma does not present any appreciable change of colour or of structure.

M. Vallin has taken from the "British Army Medical Report," for 1859 an observation very similar to his own, and from the "Bulletins de la Société Anatomique" of 1861, a case of M. Patain, which seems to bear the same explanation. Medical men ought therefore, in cases of this kind, before saying that the patient has died of syncope, to take the trouble to examine the arteries of the base of the brain.

The pain attending pericarditis has been described as felt at the epigastrium, or in the præcordial region after pressure. This is such a vague description, that it might be confounded with the pain following pleurisy of the diaphragm.

M. Noel Guéneau de Mussy* has added a diagnostic mark to inflammation of the pericardium by fixing the seat of the pain in the epigastrium.

Whilst the pain of pleurisy of the diaphragm has its focus at the junction of two lines, one drawn along the outer border of the sternum, and the other along the lower border of the chest — the hypochondriac region, the principal focus of the

* Noel Guéneau de Mussy: Contributions à la pathologie du système circulatoire. ("Gazette Hebdomadaire," 1869.)

pain arising from pericarditis is in the costo-xyphoid angle, sometimes on both sides of the xyphoid cartilage, sometimes only on one side; in that case as often on the right as on the left. At the same time a pain is felt, as in diaphragmatic pleurisy, in the track of the phrenic nerves, between the lower attachments of the sterno-cleido-mastoid muscle.

M. Guéneau de Mussy explains this phenomenon as follows:—The two phrenic nerves lying against the fibrous tunic of the pericardium share in the irritative action going on around them, transmitting it, both up and down, to the point where its branches are given off, as well as to one of its terminal branches which corresponds to the costo-xyphoid angle. The right or left phrenic nerve is more directly affected, as the inflammation is more intense in the right or left side of the pericardium. The nervous impression passes both in a centrifugal and a centripetal direction.

These perversions of sensation are only felt on pressure, nor are they always met with at the commencement of pericarditis. M. Guéneau de Mussy has, however, observed them in several cases where the other signs of the disease were still very obscure and did not allow of a sure diagnosis.

Heart disease is rarely accompanied by disorders of vision; but when they do occur, they are attended, according to M. Galezowski,* by the following alterations:

1. *Capillary congestions of the retina, and venous varicosities.*—Sometimes there are venous stases in the retina, but their progress is slow and gradual, so that vision is in no way troubled. It is only in exceptional cases that the venous congestion occasions disorders of vision either constant or periodical; but then we have no longer simple varices in the principal branches, but capillary congestions of the retina more or less marked.

The venous stases of the retina are to be sought for especially in the capillary branches. An ophthalmoscopic examination with inverted images is not sufficient to make out this capillary stasis; we must have an erect image and a strong magnifying power.

2. *Extravasation of blood into the retina and optic nerves.*—In heart disease effusions into the retina are the most common of all alterations. They take place both from the over-powerful impulse of a hypertrophied heart, or, what is more common, from the insufficient impulse of the same organ when enfeebled. The rupture of the

* Galezowski: Sur les relations qui existent entre les lésions de la rétine et celles du cœur. ("Union Médicale," 1869.)

capillaries is sometimes prepared for by an alteration in the coats of the vessels. Generally only one or two branches are ruptured, and a single eye affected. In effusions of blood into both eyeballs we ought to suspect the presence of albuminuria or diabetes, &c.

3. *Exudations from the retina.*—In these cases effusions of blood are observed in the course of the arteries. Often one or two principal branches are ruptured, and a considerable quantity of blood effused. Beside these extravasations we see white spots of exudation over different parts of the retina, especially round about the porus opticus. The affection is now no longer confined to a single eye.

4. *Embolisms of the central artery of the retina.*—These are followed by weakness, or total loss of vision, coming on without any warning. The central arteries of the porus opticus are contracted; the retina takes at first a white colour, the result of serous suffusion. There is a red spot more or less marked beside the macula lutea, and the vessels which supply it are congested.

In 1866 MM. Ollivier and Ranvier communicated some observations to the Biological Society, proving that the extravasations and thromboses which are met with in the course of, and especially towards the termination of leucocythæmia, are owing to the accumulation of white corpuscles within the capillaries. The white globules do not circulate so readily, and when they become more numerous the capillary circulation is obstructed, and the vessels become distended, hence stases, thrombi, and diffuse extravasation of the blood. This explanation, suggested by Magnus Huss, had not hitherto been supported by any corroborating observations, a task which has been accomplished by MM. Ollivier and Ranvier in a new memoir, confirming their first assertions on the production of hæmorrhage. Moreover, the study of the special conditions existing in the capillary circulation of patients affected with leucocythæmia has enabled them to explain certain phenomena hitherto put down without sufficient proofs to an unusual thinness or cachetic condition of the blood, &c.* These two authors agree with Virchow, that the accumulation of the white corpuscles in the capillaries of the brain is the cause of symptoms similar to those arising from anæmia, that is to say, headache, humming in the ears, and clouds before the eye.

* Ollivier et Ranvier: Nouvelles observations pour servir à l'histoire de la leucocythæmia. ("Archives de Physiologie," 1869.)

As the case goes on, these symptoms become worse, and the patient sinks into a drowsy condition, which afterwards passes into coma. When the tension is sufficiently strong to cause rupture of the capillaries, the blood is effused into the cerebral tissue, or into the arachnoid cavities, producing all the symptoms of cerebral and meningeal apoplexy.

The troublesome dyspnœa sometimes met with in leucocythæmia has, according to Ollivier and Ranvier, a double cause—the diminution in the number of red corpuscles, the carriers of oxygen, and the accumulation of white corpuscles in the lungs. The proof of this is to be found in an examination of the state of the blood, and of the pulmonary parenchyma. The capillaries of the air-cells will be found dilated with white globules.

In other cases the dyspnœa may be owing to circumscribed lesions of the lungs which are also met with in the liver, spleen, &c. In these organs we meet with nodules about the size of a lentil, somewhat like tubercular deposit. They are found to be congeries of white globules, the result of ruptures in the capillaries. Though generally hard and resisting, they may become softened, and produce real caverns in the lung. Thus we may have in leucocythæmia a species of false tuberculosis of the lung, which may contribute to the production of dyspnœa.

The gums are sometimes affected in leucocythæmia; they are often swollen, softened, and bleeding, so as to make one believe in the existence of scurvy. Histological examination has convinced MM. Ollivier and Ranvier that the swelling of the gums was due to an accumulation of white globules in the capillaries, or to interstitial effusions of blood. This swelling of the gums was of the same nature as the small tumours observed in other organs.

The liver is almost always increased in size, and studded with little pale masses, which are nothing else than lymphatic productions. In those cases in which the liver appears healthy, it is generally found that throughout the whole organ the capillaries are dilated to twice or thrice their usual thickness. This is owing to the obstruction of the capillary circulation, caused by the accumulation of white corpuscles. This obstruction to the circulation in its turn goes to explain the ascites observed in leucocythæmia.

The alterations in the kidneys noted by Ollivier and Ranvier, were dilatation of the capillaries, and effusions of white globules scattered through the whole organ. At the same time there was a granular and fatty degeneration of the epithelium, and some of the tubuli contained cylinders of colloid matter. The albuminuria observed in leucocythæmia may be owing to increase in the tension

of the capillaries, degeneration of the renal epithelium, and the passage of extravasated blood into the tubuli.

MM. Ollivier and Ranvier* have shown, in a second memoir, that not only may cerebral hæmorrhage occur in leucocythæmia, but that, especially in young people, leucocythæmia may actually become the cause of apoplexy. The obstruction to the circulation caused by the accumulation of white corpuscles in the vessels causes *anæmia*; the tension of the capillaries is increased, and this causes *compression of the cerebral tissue*. Extravasations take place, which occasion more or less destruction of the substance of the brain. Anæmia, and compression and disorganisation of the brain through cerebral hæmorrhage, are the three stages of the cerebral injuries observed in leucocythæmia.

The labours of Virchow and Bennett have proved that the characteristic alteration in leucocythæmia is a peculiar hypertrophy of the spleen and lymphatic glands. Small collections of lymph have also been observed in the liver, kidneys, mucous membrane of the intestines, lungs, and pleura. Some of these last-mentioned lesions seem to be sequelæ of the accumulation of white globules in the blood, continually renewed by the increased productive activity of the spleen and glands.

It would appear that the lymphoid productions in the intestines are, at least in some cases, of as old a date as the changes in the spleen and lymphatic glands themselves; in fact, they have their seat in organs regarded by anatomists as true lymphatic glands, in the solitary glandules, and agminated glands of Peyer and the glandular tissue of the mucous membrane of the intestines. Besides these anatomical considerations, an argument drawn from pathology forces us to regard these intestinal lesions in leucocythæmia as primary affections. A case reported by M. Béhier† proves that these structures may themselves become the source of excessive production of white corpuscles.

The subject of observation was a young man, twenty-five years old, who was certainly leucocythæmic, as was proved by his cachetic appearance, by the microscopic examination of the blood, and other symptoms. On dissection, the only lesions associated with leucocythæmia that could be found were enlargement of the intestinal follicles. The liver, spleen, and lymphatic glands were all normal.

* Ollivier and Ranvier: De l'hémorrhagie cérébrale dans la leucocythémie. ("Archives de Physiologie," 1870.)

† Béhier: Contribution à l'histoire de la leucémie.—Leucémie intestinale. ("Union Médicale," 1869.)

The glands of Peyer were considerably thickened wherever met with, especially near the ileo-cœcal valve.

The surface of the Peyerian patches was raised about three millimetres above the level of the mucous coat. The mucous coat itself appeared as if reticulated, and was much discoloured.

The solitary closed follicles (glandulæ solitariæ) also rose above the surface. They were of a dull white colour, and about the size of a millet seed. Here we have, then, a very remarkable form of leucocythæmia, without any alteration of the spleen or lymphatic glands proper, but circumscribed to the follicles of the bowels—in short, a true intestinal leucocythæmia.

The pathological anatomy of the muscular system is still in its infancy. This is owing to the difficulty of investigation, the most common of the lesions of the muscular fibres being a slight change of colour and consistence, which requires to be studied through the microscope. One might infer that in most of the diseases where the nutrition of the body has suffered for some time, there will be a general modification of all the tissues; but it is the part of modern science to replace deduction and theory by the rigorous demonstration of facts. Although Rokitansky and Virchow have pointed out some effects of the alterations in the muscles during typhoid fever, the honour of calling attention to the frequency and extent of these lesions belongs to Zenker. This observer regarded the muscular alterations in typhoid fever as degenerations of a specific character, distinct from inflammation. A year after Zenker's work appeared, Waldeyer, comparing them with the lesions of traumatic inflammation of the muscles, gave some evidence in favour of their inflammatory character.

In France, M. Hayem* made known before the Biological Society, in the year 1866, the first results of his researches which he has just completed. The principal conclusions which he has arrived at may be summed up as follows:—

Most of the contagious fevers, such as typhoid, variola, acute tuberculosis, measles, and scarlatina, are accompanied by derangement in the nutrition of the muscular fibres. These lesions which may even become the principal cause of death present three successive stages.

1. In the first stage, the alteration commences in the muscular fibres, and in some cases in the walls of the vessels.

* Hayem: Etudes sur les myosites symptomatiques. ("Archives de Physiologie," 1870.)

2. In the second stage, the granular and vitreous changes in the muscular fibre become more advanced, and there is a proligeration of the muscular cells within the sarcolemma. Sometimes the morbid action extends to the vessels.

3. In the third stage the old muscular fibre is succeeded by new myoplastic elements, which in time become developed into fresh muscular fibre.

The heart itself does not escape. The complications which occur, such as infiltrations of blood and pus, and abscesses, are due in a great measure to the degeneration of the vessels. We meet with inflammation of the inner coats of the arteries, with or without obliteration of their trunks, both in the voluntary muscles and in the heart.

All these inflammatory lesions of the muscles are connected with the febrile action, and follow its course and history. As they produce important symptoms during life, they are of considerable pathological interest. They are accompanied by weakness of the sounds of the heart, passive pulmonary congestion, and more or less dyspnœa. Moreover, they may become the proximate cause of sudden death.

A large number of researches have already been made with a view to determine the anatomical and physiological condition in which *sudden death* takes place during typhoid fever. We have already noticed the work of M. Dieulafoy upon the subject. M. Hayem,* going more deeply into the mechanism of syncope ending in death, declares an alteration of the vessels of the heart to be the cause of the cessation of its action.

Louis, Laennec, and Stokes had long ago remarked alterations in the muscular walls of the heart in serious cases of fever; and Zenker, in his work on the alteration of the muscles in typhoid fever, has noted a case of granular degeneration of the muscular fibres of the heart. Nevertheless, nobody thought that they had sufficient evidence to trace sudden death to alterations in the substance of the heart before M. Hayem, who has carefully studied four cases of this nature.

The alteration was visible to the naked eye, a sort of general atrophy of the organ, consisting in a thinning of the walls of the two ventricles as well as a diminution in the size of the *columnæ carneæ*.

* Hayem: Recherches sur les rapports existants entre la mort subite et les altérations vasculaires du cœur dans la fièvre typhoide. ("Archives de Physiologie," 1869.)

The muscular fibre was flabbier than usual without being actually softened. The heart was pale, wanting the red and shining appearance of healthy muscle. On section its substance was found to be of a dirty yellow colour shaded with irregular grey and purple spots, giving the whole a dry and ash-coloured look.

M. Hayem examined through the microscope the muscular tissue, using fresh sections as well as specimens hardened in alcohol and chromic acid. He found the fibres considerably altered, some of them varicose, others atrophied, most of them affected by a species of *granular degeneration*. The granular muscular fibre sometimes looks thickened, and has a shining hyaline appearance difficult to describe. As the granulations disappear under the application of acetic acid, or *aqua potassæ*, they are probably not of a fatty nature.

The alterations in the muscular fibres of the heart are of inferior importance to those which M. Hayem now describes for the first time, in the sarcous elements, in the perimysium, and in the vessels. They are constant, but very variable in their extent and distribution.

A striking feature in these changes is an increase in the number of the nuclei, or muscle corpuscles, many of which become granular and thicker than usual; some become developed into cells.

The perimysium, or connective tissue around the muscular fibrils, is also affected. Its nuclei swell out and multiply, especially along the course of the capillaries, and are now not easily distinguished from the nuclei or muscle corpuscles.

Thus we see that along with the process of degeneration, which destroys so many of the muscular fibres, there is in all probability a double work of repair going on both in the muscular disks and in the surrounding textures.

The alterations in the vessels are of even greater interest. On examining their tissues through the microscope we find the walls of the minute arteries much thickened, and most of their cavities contracted or obliterated. This is due almost every where to a swelling of the inner membrane and coagulation of the blood. We have thus, according to M. Hayem, a species of diffused inflammation of the inner coating of the arteries, not extending to the coronary arteries and their larger branches, but commencing amongst the arteries beneath the pericardium and invading many of the smaller branches which enter the walls of the ventricles, especially the left one. The immediate result of this affection would be the production of anæmia to a greater or lesser degree within the walls of the heart.

M. Hayem considers that these lesions explain the occurrence of

syncope ending in death in typhoid fever. The fibres of the heart being already degenerated would be more ready to cease acting under the influence of the anæmic condition brought about by the inflammation and obliteration of the arteries. This explanation of the occurrence of sudden deaths in typhoid fever demands further attention, for there is no doubt, as M. Hayem has himself remarked, that the study of three cases is not sufficient to settle the question.

According to M. Ranvier* the explanations which have been hitherto given of desquamation of the epidermis are quite insufficient. It has been said, for example, that it was the result of an increased production of epithelial cells; but such a process, instead of causing desquamation, would, on the contrary, increase the thickness of the epidermic layer as occurs in ichthyosis. Rindfleisch says that the formation of cells is so rapid that they have no time to become adherent. Nevertheless, it is not in the deep layers, but in the superficial ones that the desquamation takes place; nor does this desquamation occur immediately after the formation of the cells. Thus neither the seat nor the time of the production of those cells favours the correctness of Rindfleisch's view.

M. Ranvier has observed that, wherever desquamation commences, there is a dilatation of the nucleoli of the horny cells of the *rete mucosum*.

This alteration of the nucleolus produces a modification (*état muqueux*) of the cell. The horny deposit does not appear. Thus desquamation is the result of a modification of nutrition commencing in the *rete mucosum*. This mucous state may exist without any general desquamation; as in mucous condylomata, for example, we see on making a vertical section that over a certain space the cells are affected by a mucous transformation.

Dr. Chairon† read a memoir on hysteria to the Academy of Medicine on the 7th September, 1869, of which the following is a resumé:—

1. Whenever a woman or girl has compression or inflammation of one or both ovaries, there is almost always a sympathetic paralysis of the reflex action of the epiglottis and also of the pharynx.

* Ranvier: Du rôle que joue la transformation vésiculeuse des nucléoles dans la désquamation de la peau ("Gazette de Biologie," "Gazette Médicale de Paris," 1869.)

† Chairon: Étude chimique sur la nature et la co-ordination des phénomènes hystériques.

2. When these two phenomena are united in the same person, we have a condition which the author calls the *hysterical cachexy*.

3. The hysterical attack is the consequence of the reflex paralysis. The epiglottis becomes closed and cannot be raised, causing the suffocation, the convulsions of the limbs, and the spasms, which constitute the hysterical crisis.

4. The suffocation produced by repeated attacks leads to a perversion of the vital functions; hence the disorders of sensation, and the anæsthesia remarked in almost all cases of hysteria.

5. Treatment should be directed at once to the functional diseases of the ovaries. Above all it ought to be local in order to determine the resolution of the ovaritis, the principal if not the only cause of all the mischief.

It is generally admitted that epilepsy is the result of some morbid action of more or less duration in the medulla oblongata. MM. Luys and Voisin* try to prove from nine cases which they have examined that the morbid lesions in epilepsy are not exclusively situated in the medulla oblongata, but occupy a greater space than has been hitherto allowed to them; that the substance of the cerebellum itself, and the fibres of the peduncles of the cerebellum, and the grey matter with which these nerve-fibres are connected, are also frequently the seat of diseased action; and that in short these convulsive symptoms may result from injury to different points of the base of the encephalon, but especially to those parts receiving nerve fibres from the cerebellum.

The pathological examination of MM. Luys and Voisin throw light upon the anatomical distribution of the fibres which issue from the cerebellum through the superior, inferior and middle peduncles, by which the cerebellum communicates with the *corpora olivaria et pyramidalia*, the grey matter of the *Pons Varolii* and with the *corpora striata*. Convulsions seem to be produced by irritation of these parts above all others.

MM. Luys and Voisin have met with lesions of the anterior bundles of the anterior pyramids in six out of nine cases of epilepsy. These lesions seem to be accompanied by alterations in the corpus dentatum and the laminæ of the cerebellum.

In two of these cases, the *corpora striata* were evidently affected on the opposite side of the lobe of the cerebellum to that which was diseased. That is to say, if the right hemisphere of the cerebellum

* Luys et Aug. Voisin: Contribution à l'anatomie pathologique du cervelet du bulbe et des corps striés dans l'épilepsie (Archives Générales de Médecine, 1869).

were affected, the lesion of the *corpus striatum* was on the left side, and *vice versa*. We have thus in some cases a species of pathological triangle corresponding with the physiological connections existing between the *cerebellum*, a part of the *medulla oblongata*, and the *corpora striata*.

The geographical range of the malarious intermittent fevers is very extensive. Not unfrequent in France, they play an increasing part in disease the nearer we approach the equator. A non-contagious malady to become so widely diffused must have centres of infection of greater extent than the surfaces of marshes. The action of marshes is not denied, though too much influence has been assigned to it. Such is the leading argument in the book of M. Colin.*

The author has studied the etiology of malaria, and collected his principal clinical observations amongst the soldiers of the French army in the different garrisons of the Papal territory. Comparing his own observations with those made in other parts of the globe, especially in hot countries, he has given us a complete work upon intermittent fever. In the chapter on etiology, M. Colin refutes the views of those who attribute ague to certain fungi (palmellæ) or to vegetable putrefaction. Calling to mind the limited extent of marshes compared with the vast geographical area of the fevers styled paludal, he considers the development of malaria as *the consequence of the vegetative power of the soil when this power is not sufficiently exerted.* He proposes the term *telluric miasmata* as more rational than that of *paludal miasmata.*

An analysis of the causes of the insalubrity of the Campagna leads the author to allow a share to the following influences:—

1. *Telluric conditions* play a leading part on account of the partially uncultivated state of a very rich soil.

2. *Meteorological conditions*, especially those of heat and moisture, either by their excess or deficiency, can hinder or increase the development of malaria though they cannot originate it themselves.

3. *Under social conditions* the author dwells upon the fact of the resistance offered to the action of malaria by density of population. A medical plan of the town of Rome well illustrates this preservative influence.

In the chapter devoted to clinical description, M. Colin makes some remarks on the period of incubation. He proves that it has

* Colin (Léon) Traité des Fièvres Intermittentes. Paris, 1870.

not the regularity which characterises it in contagious diseases. Malaria being a poison and not a virus, its toxic action is exerted with greater or lesser rapidity according to the intensity of the morbid cause, and the constitution of the patient. The author groups the different forms of malarious fever in a regular series, commencing with the continued and remittent type, and ending with the intermittent, quotidian, tertian, and quartian. These last forms are only seen in patients who have long suffered from ague.

M. Colin traces the diversity of types to two conditions. 1. A high temperature which favours the tendency to continuity, so that remittent and continued fevers are more common in summer and in hot countries. 2. The date of the malarious poison, for the febrile attacks become more and more intermittent after a first manifestation of the disease.

The author commences his description of malarious fevers with some general considerations on the necessity of restricting the number of so-called complications, and on the relations that these diseases have with the season, with the type of fever which has gone before, and with the constitution of the patient.

According to the author the type of malarious fevers is almost always a continued one. He gives the premonitory symptoms which foretell its appearance. The diagnosis of these affections ought not to be based upon the periodical character of the febrile attacks, but upon their nature, which has been determined by observers in hot countries and marshy districts. Before establishing a diagnosis, a medical man ought to consider the nature of the place, the season and the prevalence of simple intermittent fever.

M. Colin makes a distinction between the anatomical lesions of acute and chronic malarious poisoning. In the first of these forms the spleen is softened and darkened in colour; in the second, it is hardened and hypertrophied.

In the chapter on treatment the author discusses the therapeutic and physiological action of sulphate of quinine, and insists upon the necessity of employing some other medicines during the course of malarious fevers, both in their acute and chronic states.

As a prophylactic measure he points out some means of preventing the unhealthy emanations of the earth, and recommends a species of culture adapted to the productive powers of the soil of the different haunts of malaria. He goes over the rules which a new comer to a malarious locality ought to adopt, and points out the most favourable time of arriving either at Rome or at the tropics. He warns people of the danger of dwelling in the suburbs of towns or at certain heights, which are sometimes more dangerous

than in the plains, and insists on the advantage of a residence at sea at a sufficient distance from the malarious coasts.

The old popular belief that malignant pustule or charbon was sometimes inoculated by the agency of flies has recently received a scientific demonstration from the researches of MM. Raimbert,* and Davaine. Some of the insects popularly called flies are armed with a sting connected with glands secreting a poisonous fluid; others have buccal organs of a hard and perforating character, a horny trunk or serrated bristles; others have nothing but a soft labium used for sucking.

Some of those kinds of flies which wound the skin with their stings or buccal organs were shut up in a bell jar with a glass containing blood taken from a charbon and mixed in water, but they neither appeared to suck the fluid, nor were bacteria found in their intestinal canal.

The same experiment was made with some of those flies which appear to live on dead animal matter, or upon the blood of living animals, and with the same results.

The common house fly and the flesh fly were found to apply their trunks to the contents of the glass, and even to dip their feet into the liquid. On being examined two hours after, it was found that the abdomen was swollen out with a red fluid containing a large number of bacteria. These minute organisms, characteristic of blood taken from charbons, were also found on the trunk, paws, and wings, as well as in the excrements of the flies.

Guinea pigs, inoculated with the wings and paws of the flies which had been in contact with diseased blood, died of charbon; and numbers of bacteria were found in the blood of their hearts and spleens.

M. Raimbert, wishing to find out whether the virus could make its way through the epidermis, made use of a tube, closed by a piece of cuticle, into which he dropt some blood diluted with water. The extremity of the tube covered by the membrane, was immersed into another fluid of a different composition. Now if the bacteria could traverse the different layers of the epidermis they would be found in the fluid in which the tube was plunged.

* Raimbert: Recherches expérimentales sur la transmission du charbon par les mouches ("Comptes rendus de l'Institut," 1869).

Davaine: Etudes sur la Contagion du charbon chez les Animaux Domestiques ("Bulletin de l'Académie de Médecine et Gazette Hebdomadaire," 1870).

From these experiments the author draws the following conclusions:—

1. Those flies which have trunks or bristles to pierce the skin, do not, in all probability, diffuse the virus of charbon. Those winged insects which are armed with a sting, only inoculate their own venom.

2. Flies coming in contact with the carcases of animals which have died of charbon, and feeding upon them, can carry away the virus with them, and deposit it upon the skin.

3. The virus of charbon deposited on the skin may find a way through its different layers.

At the same time, M. Davaine made a series of experiments similar to those of M. Raimbert. The insect he employed was the flesh fly, *musca vomitoria* of Linnæus. He communicated the disease to guinea-pigs, either by the inoculation of their paws and trunks, previously brought in contact with blood drawn from charbons under a bell jar, or by simple contact with a small incision made in the skin of the quadrupeds.

Experiments made with flies removed from the infecting fluid for three days, gave the same results. The mouth of the flesh fly, like that of the house fly, cannot be inserted into the integuments of animals. The insect has only a soft membranous trunk, covered with hair, and terminated by two thick labia. Nevertheless, the trunk, as well as the feet and wings, may become imbrued with blood, which may be subsequently deposited upon a sore. Now, bullocks and horses are frequently excoriated by the yoke or collar, and sheep by the teeth of the dog. It is probable the fly finds the virus in the effusions of blood so frequent with animals seized with charbon, or it is furnished by the men who bleed the diseased animals, apply setons, or open the swellings or abscesses, allowing all the blood and discharged matter to fall on the litter of the stable or sheep-fold. After death, too, the carcases are left to be devoured by insects, in some out-house of the farm.

M. Davaine thinks that the gad-fly may be the agent of transmission of charbon, at least analogy would seem to lead to this conclusion. This creature has a soft trunk, covered with hair, with thick labia at the end, like the house or flesh fly. It possesses horny antennæ, like little lancets, by which it can pierce the skin and suck blood through the trunk. This process is soon repeated upon some other animal, for the gad-fly is very voracious. If the first animal on which it alighted had the disease, the virus would be transmitted to the second, as was done in the experiments.

From the experience gained by these investigations, the follow-

ing prophylactic measures seem advisable:—Animals visited by charbon, and especially their carcases or offal, ought to be kept out of the way of flies, and fumigations of sulphur or tobacco, not of chlorine, should be made in the sheep-folds and stables. Nor should dung-hills be collected near the infected spots, where the larvæ of the flies may find a nidus.

The propagation of charbon, through the agency of flies, is not an isolated phenomenon, and, indeed, has nothing surprising about it. These insects disseminate the germs of disease, as other insects disseminate the pollen of plants.

Prolonged exposure to the sun at a high temperature causes serious illness, and sometimes death. Even in our temperate climate, we meet with sunstroke during summer amongst the reapers, and amongst soldiers on the march and at reviews. Similar cases, also, occur in all seasons amongst men who work in high temperatures, such as sugar-refiners, glass-blowers, and furnace men. In spite of numerous works, published upon this subject during the last few years in America, England, and Germany, much still remains to be cleared up. While some authors have devoted themselves to the task of describing the clinical symptoms of sunstroke, others, like M. Vallin,* have endeavoured, by pathological examination and experiment, to explain the nature of the disease and the causes of death.

The author has used for experiment dogs and rabbits. In those cases in which the animal was exposed to the sun, sometimes completely free, death was not a common result. Sometimes it was held down on its back in a wooden trough, in that case, death always followed with more or less rapidity when the thermometer rose above 30° C. In six experiments, rabbits held by a string of some length upon bare dry ground exposed to the sun, about noon, were still alive two hours after, while other rabbits, tied fast upon a plank, died in less than an hour. These results had already been noted by other physiologists. M. Vallin refuses to accept the explanation of Richardson, that in the animal whose motions are not impeded, the temperature does not rise so high, owing to the transformation of heat into motion. According to Vallin, the animals which can move at pleasure, by continually shifting their position, expose different parts of the body to the rays of the sun, giving the other parts time to cool, whilst the soil upon which they move has a

* Vallin: Recherches expérimentales sur l'insolation et les accidents produits par la chaleur ("Archives Générales de Médicine," 1870.)

lower temperature than the wood upon which the other animals are tied, which soon heats up to 45°. What seems to support this explanation, is that the author kept a rabbit, whose movements were not impeded, in a wooded compartment, exposed to the sun at a temperature of 51°, and death took place in thirty-five minutes, with the usual symptoms and lesions.

The experiments of M. Vallin shew that exposure to the sun causes death to animals at the end of from thirty-six to sixty minutes, according to the intensity of solar radiation. The author classes the symptoms, which are not very constant, into three stages.

1. After some minutes, violent efforts to escape; hurried respiration (120 – 160); with the dogs, salivation. This first stage lasted from twenty-five to thirty minutes. The temperature at the rectum was from 38°, 39° to 43.5°, 44°.

2. Almost always before this temperature was reached, respiration became suddenly or gradually slackened, falling from 150, and even higher, to 96, and even to 60. It is now of a sighing or broken character. The animal is calmer, prostration comes on, but intelligence and muscular activity still remain. This stage lasts five minutes. The bodily temperature at the rectum is from 43.5° to 44°.

3. The third period is marked by convulsions. When the respiration has fallen to 72°, there follows a number of nervous symptoms, tremors, the hair standing on end, and contractions of the muscles of the limbs lasting for a second or two, and returning again and again. Sometimes the attack is more sudden and more complete. The animal, hitherto quiet, starts up, its body stiffened by tetanic contraction; respiration stops; the eyes start, moving wildly; the bladder is sometimes emptied; and the animal, whose limbs now become stiff, falls into a comatose state, which ends in death. In general, convulsions come on when the thermometer rises above 44° or 44.5°.

On dissection, the ventricles of the heart are found contracted, the left one especially very rigid, the walls applied against one another, the auricles, especially the right one, containing more or less black blood, either fluid or in coagula. The ventricles, though examined less than a minute after death, had ceased to beat, and were entirely unaffected by stimuli of all kinds, such as pricking, percussion, or electricity.

The diaphragm, next to the heart, loses its irritability the soonest; in most cases, it does so immediately after death. It could not be made to contract either by pinching or by electricity.

Some muscles of the limbs and trunk begin to turn rigid while the animal is moribund. In general, cadaveric rigidity is complete everywhere at the end of half an hour. The muscular tissue has, at the same time, a strongly acid reaction.

The lungs are congested and ecchymosed. The cerebral sinuses and meningeal veins are swollen with black blood; but the cerebral tissue is not injected.

According to M. Vallin, the principal lesion, the origin perhaps of all the rest, is the sudden rigidity of the left ventricle and of the diaphragm. Now, we know that the *rigor mortis* is caused by the coagulation of the muscular juice within the sheath of the sarcolemma (Brucke and Kühne); and we also know that this coagulation takes place more rapidly at high temperatures. A piece of muscle plunged into a liquid at a temperature from 45° to 48°. coagulates almost instantly. As the death of animals exposed to insolation takes place the moment the temperature of the blood rises to 45°, we may regard it as due to coagulation of the heart and diaphragm. Claude Bernard has proved that the hottest place in the body is where the *vena cava* passes through the diaphragm.

M. Vallin applies these facts, most of which, as he acknowledges, have been already given to the world by Claude Bernard, to cases of sudden death, observed in human beings, which have been generally put down to asphyxia or cerebral congestion.

Our author has found that the oxygen of the blood, in animals dead of sunstroke, has almost completely disappeared; and as the carbonic acid is also diminished, though slightly, the gases of the blood must exist in inferior quantity. Asphyxia necessarily follows as a secondary result; but the stoppage of the heart and the diaphragm must be regarded as the primary causes of death. But do things always go in this train? Does not heat first exert its action upon the nervous system, and thus become the cause of death? Several years ago, Harless studied the anatomical and functional injuries observed in the nerves when the body was exposed to a high temperature. It is known that at from 35° to 36° there is a sudden alteration in the nervous substance. The white substance of Schwann liquefies at different temperatures in different species of animals.

M. Vallin has made some experiments in order to ascertain whether, as Harless thinks, this liquefaction is really the cause of the bad effects produced by heat upon the nervous system.

An India-rubber bag was fitted to the head of an animal, and a current of hot water was made to pass within the layers, the temperature of which was measured by a thermometer placed between

the cap and the head. This local application of heat was not attended by the same results that are observed on the exposure of the whole body to a high temperature. The heart was found loose; the ventricles relaxed; and the organ had lost its irritability to mechanical and physical agents, though the central temperature was no higher than 41.4°, and consequently incapable of modifying the state of the muscular tissue. Death seems to have resulted from stoppage of the heart's action; but how was this brought about? M. Vallin thinks that the condition induced by his experiments is oftener met with during life than one would readily believe, as for example, when the head is confined in some kinds of headdresses.

M. Vallin divides the symptoms produced by heat into two categories. In the first, the heating of the body is rapid and general, the temperature of the blood rises to 45° C., and death takes place after some convulsions, owing to the coagulation of the muscular fibres of the left ventricle, and the distension of the veins. In the second case the heating of the body is slower and most marked at the seat of the nervous centres; the temperature of the blood does not rise much higher than usual; and death seems to be caused by injury to innervation, and the stoppage of the heart's action through relaxation; a similar result follows excitement of the pneumogastric. These two classes of symptoms correspond with what authors have described under the names of sthenic and asthenic sunstroke.

Surgical Pathology.

Every surgeon knows that in most granulating sores, healing takes place at the edges. In some exceptional cases we see little islets of epidermis form on the surface of a sore at more or less distance from the edge, and these new centres of repair make the healing process go on much quicker.

Though this fact is admitted, its explanation is not so clear. Some people think that a small portion of the *rete mucosum* has escaped destruction, a view which is strengthened by the fact that these centres of repair are frequent after burns. This explanation is, however, not universally adopted by pathologists.

M. Reverdin has tried to originate these islets of epidermis by grafting flaps of skin upon a granulating and suppurating surface. We give one of his cases.*

* Reverdin; Greffe épidermique (Société de Chirurgie en "Gazette des Hopitaux," 1870).

A man, thirty-five years of age, slipped from a ladder, and tried to escape falling by clinging to a bar of iron with his left arm. The skin was rubbed off from the fold of the elbow-joint to the middle of the fore-arm, forming a large flap, which soon mortified. The surface left bare consisted of subcutaneous areolar tissue, and, on the outer side, of the muscular aponeurosis, which was torn in some places. The wound soon commenced to granulate. The accident took place on the 16th of October, and on the 14th of November a small border of integument had begun to appear on the edge of the sore. It extended rapidly. On the 24th of November M. Reverdin removed with the point of a lancet two small flaps of the cuticle, taking care to leave the *cutis vera*. The first flap was very small, the second about a millimetre in size. The surface from which it was taken had the appearance of a trifling abrasion. The two flaps were placed upon the middle of the sore, at a little distance from one another, and retained by strips of plaister.

Next day the flaps still kept their places in spite of considerable suppuration. They appeared rather pale and somewhat swollen. On the 27th of November M. Reverdin shaved away in the same manner another flap of cuticle, a little larger than the two former, measuring from three to four square millimetres. He placed it upon the sore at a little distance from the others.

On November 28th the three flaps appear adherent. They can be rubbed with a piece of charpie without being detached.

On the 1st of December the first two flaps are united, forming a small white spot. Evidently a small epidermic zone is forming around them. The third flap seems also increasing.

On the 7th of December the three flaps unite, forming a small white islet in the sore, resembling the cuticular border which appears on the edges of healing ulcers.

" On examining the mouth of a new-born child, or of a fœtus in the last month of intrauterine life, we almost always see upon the palate, and often upon the gums, little white rounded grains packed in the mucous membrane. These are small encysted masses of epithelium, which generally begin to appear at the sixth month of fœtal life, and which disappear of themselves towards the second month after birth."

Such is the description given by MM. Felix Guyon* and Emile

* Felix Guyon et Emile Thierry. Note sur l'existence temporaire de kystes épidermiques dans la cavité buccale chez le fœtus et les nouveaux-nés (" Archives de Physiologie," 1869).

Thierry of these little tumours. They are generally isolated, though occasionally confluent. They resemble those little white grains which one sometimes sees on the skin of the cheek and nose in new-born children. They are about the size of a pin's head or a grain of millet seed. They vary in number, and are commonest upon the palate, though often found upon the alveolæ of the upper jaw, more rarely upon the lower one.

These tumours disappear by the dehiscence of their cysts. Their walls are formed by connective tissue, composed of flattened plasmatic cells. Their interior is made up of horny cells of pavement epithelium. The cavities of the cysts are completely closed in. MM. Guyon and Thierry do not think that these tumours are foreign cysts enclosed by the growth of the fœtus. Such a view is negatived by a study of the development of the palate and the maxillary alveoli, and by the late appearance of the cysts in intra-uterine life. Our authors regard these little tumours as abnormal sebaceous glands arrested in their development.

In a practical point of view these cysts are of some interest: they are often mistaken for the productions of disease, and sometimes for aphthae, while, as has been seen, they are perfectly normal growths.

Resection of a part of the calcaneum is a well-known operation, but its complete or almost complete removal is new in surgical practice. It was first performed by Monteggia in 1814, and in 1837 by Frederick Robert only for the second time. A sufficient number of cases of this operation have now been published, but with so many failures to successes that removal of the calcaneum has always been a subject of debate, and never passed into regular practice.

It is therefore of some interest impartially to compare the results of this operation, in order to judge whether it ought to be abandoned or adopted. M. Polaillon* has collected all the cases of removal of the calcaneum which he could find in the annals of medicine, classified them, and compared the results so as to put us in a position to appreciate the different conditions of success and failure. He has collected sixty-four cases, given with more or less detail. In nine of these cases the result was doubtful. There remained fifty-five cases, thirty-nine of which were successful, and sixteen failures.

* Polaillon: Mémoire sur la valeur de l'extirpation du calcaneum ("Archives Générales de Médecine," 1869).

From the analysis of his cases, M. Polaillon has arrived at the following conclusions:—

Removal of the calcaneum ought to have a place in surgery, since it saves a portion of the foot which is still useful in standing or walking.

The number and value of successful operations vary with the age of the patients. In children and growing people it succeeds eight times in every nine cases, giving excellent results. In adults half the cases miscarry, and even in the successful ones the results are unsatisfactory. The foot does not accommodate itself to the loss of the calcaneum after the ossification is complete.

In disease of the calcaneum, extirpation of that bone ought to be resorted to in children and growing people; in adults it is best to amputate. With them a stump is a much better and stouter support than a foot without the calcaneum.

It ought, however, to be known that amputation is more frequently followed by death than removal of the calcaneum. When disease of the heel has been long treated by rest and other means, the surgeon, before operating, has to determine if the disease is confined to the calcaneum. If this is certain, he may remove the diseased bone. If, however, the limits of the disease can neither be determined by the history and symptoms of the case, nor by direct examination, the idea of removing the calcaneum need not be abandoned. The surgeon may make his incisions, so as to be ready either to remove the calcaneum, the entire foot, or the lower portion of the tibia and fibula, according to the extent of disease discovered.

In comminuted fracture of the calcaneum by fire-arms or other injuries, removal of the bone may be performed. In caries of the middle of the bone, which has not yet reached the articulating surfaces of the calcaneum, the diseased portions alone ought to be removed.

In caries involving the whole of the calcaneum, the bone should be entirely removed, and the corresponding articulating surfaces cut away or cauterised. But if the caries has already seriously affected the astragalus, cuboid, and scaphoid bones, it is better to remove the whole foot, than to have to do it at a later date.

In total necrosis and phlegmonous periostitis, extirpation of the calcaneum succeeds best, the periosteum being detached by the suppuration, and the sequestrum easily removed without it. It is in such cases that bone is most readily reproduced. The tumours which might require removal of the calcaneum are the enchondromata and fibromata, scarcely ever the carcinomata.

The presence of fistulous openings, small ulcers, or inflammatory indurations of the skin of the heel, do not preclude the removal of the calcaneum; but considerable ulceration of the skin, infiltration from a cancerous tumour, or even considerable thinning of the integument from a tumour of a non-malignant character, must be regarded as counter indications. Even should the flap heal, the patient would have to walk on a cicatrised substance, with all the miseries resulting therefrom.

In removal of the calcaneum the incised surface is of no great extent, hence the operation may be performed even on patients who have suffered a long illness.

Under the title mentioned below,* M. Larrey has discussed the grave and difficult question of the indications and counter-indication of trephining in the different lesions of the skull and brain.

"The general conclusion," says M. Larrey, "at which I have arrived, after this long enquiry into the question of trephining, containing the analysis or *resumé* of more than a hundred and sixty cases of injuries of the head, is, that the operation of trephining ought to be reserved for some well-defined cases with well-defined symptoms, and not undertaken in a hurry on doubtful cases, under the danger of aggravating the injuries and hastening a fatal termination. The prompt and skilful application of other remedial measures may in most cases help the wonderful efforts of nature towards the cure of the most formidable injuries."

The author groups the indications for trephining under the three following heads:—

1. In fractures of the skull, either with more or less perforation, or with the impaction of fragments, when rupture of the *dura mater* or injury to the brain is the cause of serious and continued symptoms, and after all attempts at replacement by other means have failed.

2. In fractures complicated by the fixation of foreign bodies or projectiles in the walls of the cranium, or by penetration of the brain or its membranes with persistence of bad symptoms, and where there are no other available means of extracting the foreign bodies.

3. In various mechanical injuries of the head, complicated with the symptoms of serious and persistent injury to the brain, such as those of contusion and compression, or prolonged hemiplegia resulting from effusion of blood or pus presumed to be circumscribed, provided always the local lesion has been defined; but

* Larrey: Étude sur la trépanation du crâne dans les lésions traumatiques de la tête ("Mémoires de la Société Impériale de Chirurgie").

even in such cases the operation must not be undertaken till other means have been found insufficient.

As the modifications of the spermatic fluid in different states of health are imperfectly known, the communications of M. Liégeois on this subject are of much interest.* They were read to the Surgical Society, and will appear in its Memoirs. The following are the conclusions to which the author has arrived :—

1. Every man, if free from disease of the genital organs, possesses from puberty even to extreme old age the material elements of fecundation.

2. Some men who want this procreative power (cryptorchids) are not distinguishable from other men, either by their appearance, or mental or moral qualities.

3. Neither acute nor chronic diseases seem to have much influence upon the spermatic secretion, save in old men, where they often occasion its suspension.

4. Neither syphilis, nor a course of mercury for its treatment, has any effect upon the secretion and vitality of the spermatozoa.

5. Parenchymatous orchitis often produces aspermatozoa, owing to the injury suffered by the secreting action of the testicle. If the orchitis involve both organs, incurable sterility is the consequence.

6. Double syphilitic orchitis, when severe, suspends the functions of the testicle, and even causes impotence; but spermatozoa and virility may return under suitable treatment.

7. Double gonorrhœal epididymitis may cause permanent obliteration of the spermatic canal, by depositing plastic lymph in the interior of the canal of the epididymis. This happens more frequently than has been generally admitted. In those cases in which the spermatozoa return, the inflammation has not been severe. The disappearance of swelling and induration of the epididymis is no proof of the return of the spermatic fluid.

In double gonorrhœal epididymitis, accompanied by obliteration of the canal of the epididymis,—

A. The secretion of the testicle persists, but only for a time; after an interval, whose duration it is impossible to ascertain, the spermatozoa no longer appear in the fluid still secreted.

B. Obliterations of the canal of the epididymis often occasion a diminution in virility.

* Liégois: Mémoire sur le Sperme et ses Modifications dans les Maladies ("Gazette des Hôpitaux," 1869).

C. In spite of the absence of spermatozoa in the *tubuli seminiferi*, the other secretions, which mix with the spermatic fluid in the ejaculatory duct, are not altered either in quality or quantity; sometimes, indeed, the quantity is increased.

D. The only difference in the spermatic fluid passed in these conditions is the absence of spermatozoa.

8. Double epididymitis, not gonorrhœal, caused either by masturbation or by some injury, is not in general followed by complete obliteration of the canal of the epididymis, either because the inflammation was not severe, or because it implicated the general tissue of the epididymis, instead of being most intense in the spermatic passages. In these cases the presence of spermatozoa may co-exist with that of swelling and induration of the epididymis.

9. Gonorrhœal epididymitis on one side may seriously affect the secretion of the other organ, that is, of the one not affected by the inflammation.

10. This is true of all other organic lesions of the testicle.

11. Atrophy and arrest of development of the testicles are attended by aspermatozoa.

12. This holds good in all the lesions which destroy the parenchyma of the testicle, or which cause atrophy by pressing back the *tunica albuginea*.

13. The false membranes which in some cases surround the testicle, the adhesions which unite the two opposite walls of the *tunica vaginalis*, and the cysts large or small, which appear in the epididymis, do not seem to hinder either the secretion or expulsion of the spermatic fluid as is generally believed.

14. In cysts of the epididymis a milky colour of their contents is not characteristic of spermatozoa, nor is absence of such a colour a proof that they are absent.

15. Double hydrocele is accompanied by aspermatozoa only when it goes along with a double obliteration of the canals of the epididymis, the result of gonorrhœa. When it is owing to an acute or sub-acute inflammation of the *tunica vaginalis*, apart from the seminal gland itself, the spermatic fluid is normal, and contains spermatozoa, though the epididymis is in most cases hard and swollen. One case seems to show that the pressure of the fluid of hydrocele upon the *vas deferens* or epididymis may stop the passage of the spermatic fluid.

16. Obliteration of the *vas deferens* on both sides has the same effect upon the spermatic fluid as similar lesions in the epididymis. Aspermatism (absence of the spermatic fluid) may be the result of

blocking up of the *vas deferens* within the pelvis, although erection and coitus may still take place.

17. Varicocele does not seem to have any influence upon the spermatic secretion.

18. It has been concluded from some published cases that encysted hydrocele and inguinal hernia are sufficient to cause obliteration of the *vas deferens* in men advanced in life, but there are no observations to prove that this may happen with younger men.

19. Trusses for inguinal hernia have not the injurious effects hitherto assigned to them.

20. In spermatorrhœa the spermatozoa are not altered in appearance as has been asserted, and they have been observed to be as numerous in the spermatic fluid as in normal conditions. Nevertheless, they may be found absent in cases which have not reached the state of marasmus, to which spermatorrhœa often leads.

Though orchi-epididymitis is one of the commonest and best known complications of gonorrhœa, there are still some things about it which are not understood. Amongst these are the neuralgic pains which the disease sometimes excites. The testicle, like several other organs, when diseased, may become the centre of origin of neuralgia, both in near and distant parts. These radiations of perverted nervous actions which are neither constant in their seat, their intensity, their history, nor in their secondary symptoms have nothing in common save the exciting cause—the disease of the testicle and the neuralgic character of the pains. M. Maurice* in a series of papers on the subject shows that these sympathetic pains are of reflex character. The following are the conclusions at which the author has arrived in his comprehensive study of this form of disease:—

1. In orchi-epididymitis there are two kinds of pain. A., *local* and *direct* pains, arising from the inflammatory processes going on in the epididymis and the testicle; B., *reflected sympathetic* or *distant* pains constituting *reflex neuralgia.*

2. Neuralgic pains are sharp or dull, paroxysmal, or continued, and come and go at irregular intervals. While the inflammatory pains are excited by contact, the neuralgic ones commence without any apparent exciting cause, and are relieved by pressure. They also shift about, not only to different parts of the trunk of the same nerve, but to different branches belonging to the same plexus or even to different plexuses.

* Charles Maurice: Étude sur les névralgies symptomatiques de l'orchi-épididymite blénorrhagiques ("Gazette Médicale de Paris," 1869-1870).

3. They do not share in their course the regularity of the inflammatory process which excited them. They seem to acquire an independent action of their own, though originated by a local inflammation, and bear the irregular and shifting character common to neuralgic pains.

4. The morbid impression which excites these reflex neuralgias commences at the testicle and ends at the spinal cord. This *incident* impression is referred or not referred to the diseased organ. When it reaches the nervous centres, it exerts a functional morbid influence upon the nerve cells, which transmit to the sensory nerves in communication with them *painful sensations*, in accordance with the law of the *eccentricity* of *sensitive phenomena*.

5. The laws of reflex motor action, as stated by Pfluger, do not exactly correspond with those of reflex sensory action. Painful impressions may be reflected to a greater distance from the nervous centre than the point of origin. These reflected neuralgic pains shift about to all places, observing no fixed rules. The generalisations which have been made from a study of the phenomena of reflex movement do not apply to the excito-sensitive faculties. The medulla oblongata is the centre of reflex motor action, receiving and replying to the reflex sensory impressions. In the case of the excito-sensitive impressions the centre seems to be the whole grey matter of the brain and spinal cord, which diffuses its reflected neuralgia over different parts of the body.

7. In orchi-epididymitis the pain may be reflected to the viscera through the spinal cord or the ganglia of the sympathetic system.

8. The intensity of the reflected pain does not correspond with the intensity of the local inflammatory pain. Sometimes a trifling local pain is attended with very severe neuralgia at a distant point of the body.

9. Reflected neuralgia is of lesser intensity in proportion to the distance of the origin of the nerves to which it is referred from the giving off of the nerves of the inflamed testicle.

10. Muscular contractions frequently exasperate reflex neuralgia, which on its part sometimes excites involuntary muscular contraction. In these complicated phenomena the sensory nerves in whose tract the pain is felt, as well as the motor nerve of the muscles are both involved. Convulsive shocks, cramps, muscular rigidity, and muscular weakness, are sometimes observed in cases of orchi-epididymitis in which the reflex pains are very violent.

11. When the radiation of reflex neuralgia excited by a morbid impression on the testicle is carried to the great sympathetic plexus, phenomena are manifested of a much more complicated character

than simple pain, such as peristaltic and anti-peristaltic movements of the intestines, gastro-hepatic congestion, fulness or contraction of the circulation, with corresponding modification of the bodily temperature.

12. Reflex neuralgia, symptomatic of gonorrhœal inflammation of the testicle, is generally uni-lateral, and on the same side as the diseased organ. Sometimes it is bi-lateral in the form of a double lumbo-abdominal neuralgia.

13. Pain in the back is the most frequent of the reflex neuralgias of orchi-epididymitis; it has two centres, one over the kidney, the other between the sacrum and ischium.

14. Then comes lumbo-abdominal neuralgia with its three centres, inferior lumbar, hypogastric, and inguinal.

15. Sympathetic pains, involving the leg upon the same side as the inflammation, may be divided into two groups, an anterior or crural group, and a posterior or sciatic group.

16. Sometimes the pain invades the walls of the thorax, either as a vague uneasiness, or what is more common, by occupying a fixed point and radiating along the intercostal nerves.

17. Reflected pains in the bowels symptomatic of gonorrhœal orchi-epididymitis have three centres, situated in the renal, hypogastric, and epigastric regions.

18. In the causation of these symptomatic reflected neuralgias the first part as a factor is due to orchi-epididymitis; the second to inflammation of the tunica vaginalis; and the third to inflammation of the spermatic cord.

19. *Irritable testicle* is in most cases only a localised inflammatory affection of the testicle which has passed into an obscure chronic form.

20. Inflammation of the testicle or of its appendages possesses in a remarkable degree the power of *rapidly diminishing the number of red globules* of the *blood*. The liability of patients labouring under this affection to become anæmic increases with age.

During pregnancy the uterus is inclined to the right in eight cases out of ten, and many explanations have been given of this fact. Some trace it to the habits, common to women, of using the right arm more than the left, and of lying on the right side. After enquiry, this explanation has been found erroneous. The assertion of Levret, that the uterus was always inclined to the side on which the placenta was inserted, was also proved to be a mistake.

Madame Boivin's explanation was that, as the round ligament on the right side was shorter and stronger, the uterus ought

naturally to turn to the same side; but MM. Pajot and Rambaud have proved that the greater length of the round ligament on the left side is not nearly so common as the inclination of the uterus to the right. The position of the rectum, and its frequent distension, cannot be the cause, since the inclination of the uterus is admitted not to take place until the organ rises above the brim of the pelvis into the abdominal cavity.

M. Pajot thinks that this lateral inclination to the right is connected with the development of the organ.

M. Guyon,* resting on two kinds of proof—one drawn from anatomy, the other from observations made upon tumours which rise from the pelvis into the abdomen, in the same manner as the gravid uterus — attributes the inclination to the right to the mesentery and to the small intestine. This was also the opinion of Désormeaux.

In two women with ovarian cysts the tumour was manifestly turned to the right. In these cases, as the tumour was no bigger than that of the uterus at its full time, the analogy was as complete as it could be. In one of these patients the cyst had commenced on the left, which made the position it took on the right of the abdomen all the more remarkable. The direction of the mesentery from left to right (from the second lumbar vertebra to the right iliac fossa) might appear unfavourable to the views of Désormeaux and of M. Guyon. One would think that the mesentery directed from the left to the right, and from above downwards, ought rather to impede than help the inclination of the uterus to the right. But on narrowly examining the state of the case, one perceives that it would be difficult for the uterus, rising in the abdominal cavity, to keep beneath the mesentery. Rising above it, the uterine tumour is necessarily turned to the right by the inclined plane offered by the upper side of the mesentery, whilst the small intestine—that is to say, the most movable part of the digestive tube—is directed to the left.

In his work on Ophthalmoscopy, M. Maurice Perrin,† Professor at Val de Grace, has united two means of study hitherto kept apart—verbal exposition and artistic illustration. The description, without plates, of diseases resulting from alterations in the globe of the eye, only leaves a vague and fugitive impression on the mind;

* Felix Guyon: Sur la cause de l'inclinaison de l'utérus à droite pendant la grossesse ("Archives de Physiologie," 1870).

† Maurice Perrin: "Traité pratique d'ophthalmoscopie et d'optométrie." Paris, 1870.

and drawings of these pathological changes, apart from the text, only pourtray certain conditions, without giving the knowledge needful to make them instructive.

Uniting theory to practice, and pathology to clinical description, M. Perrin has collected in his atlas a large number of the different varieties of diseased conditions, and based his remarks upon these illustrations.

The author has endeavoured to clear up some questions which cause much confusion in examinations performed with the opthalmoscope. The kind of light to be used, the image formed in the eye, the refraction of the eye of the observer and of the eye under observation, and other sources of aberration are considered and explained, so that the student may learn both how to handle the instrument, and to avoid sources of fallacy.

M. Perrin has carefully examined the healthy eye with the opthalmoscope, a study hitherto much neglected. The variations in the conditions of the *porus opticus*, of the vessels of the retina itself, and, above all, of the choroid, in their normal condition, are illustrated in the atlas. Giving only the second rank to rare facts, interesting chiefly to experts, the author has bestowed most attention on the commonest diseases, which are of most importance to the practitioner. On this account a great many illustrations have been given of posterior staphyloma, chronic choroiditis, detachment of the retina, and atrophy of the *porus opticus*.

The work contains 144 separate engravings, drawn from nature, and about the same size as that in which they are seen through the opthalmoscope. The first part alone is published; the second part will appear in a few months. Its object will be to assist the study of optometry, as yet so little attended to. Avoiding all mathematical formulæ, the author will depend upon experimental demonstration alone.

Changes in the refractive power of the eye are the most frequent causes of derangement of vision. The method usually employed to detect and measure such defects is to ascertain, by trying a number of glasses, the one which represents most closely the excess or deficiency of the refractive power. In this manner we reach our conclusion by a series of empirical observations, and the exactness of the result depends upon the precision in the construction of the glasses used in the experiment. To determine the nature and degree of dioptric derangement, we require to place the object examined at a considerable distance—about four yards, at least. It is also necessary to have a good theoretical acquaintance with optometry; and the necessary process of passing before the eye a

number of glasses of different refractive power confuses the organ and renders it apt to make a change in its accommodation.

To amend these inconveniences, MM. Perrin and Muscart* have contrived a new optometer. This instrument is composed of a horizontal brass tube, supported by a stand. At one end of the tube is fixed an object etched upon darkened glass, through which light is transmitted; at the other end of the tube is the eye-piece, which is a convex lens. The objects intended to be looked at by the observer are so many small printed letters, and groups of circles to try the vision upon circles, and a set of parallel lines to try the vision upon straight lines. In the interior of the tube there is a moveable concave lens, of which the divergent power is less than the convergent power of the convex lens, and which may be moved from the eye to the object by means of a slide, a pinion, and a rack.

According to the position it occupies in relation to the object, the concave lens can be used to give different degrees of divergence to the rays of light which pass through the darkened object-glass, and thus test the nature and extent of the loss of adjusting power which the eye has suffered, whether in myopia, hypermetropia, or the different abnormal states of accommodation, as in spasms, presbyopia, etc.

The slide upon which the concave lens moves, carries an index fitted to a graduated scale, marking in inches the degrees of refraction. This scale is the result of careful experiment.

The tube thus consists of three parts; the first, the middle part, which corresponds to the normal refractive state of the eye in Emmetropia, marked by the letter E; then the second, which extends from E to the darkened object-glass, marked H, and corresponds to the different degrees of hypermetropia; the third part, which extends from E to the eye-piece, is marked M, and corresponds to the different degrees of myopia.

One instrument correctly graduated may be used as a model for others.

This optometer may be employed in the following manner to determine spherical and cylindrical deficiencies in the dioptric apparatus of the eye:—

1. In hypermetropia, or myopia, the pinion is placed in the field of vision for the emmetropic eye. The patient is then made to

* Maurice Perrin et Mascart: "Mémoire sur un nouvel optomètre destiné à faire reconnaitre et à mesurer tous les vices de la réfractions de l'œil "Annales d'oculistique." 1869.

look through the tube, and the concave glass is moved towards the object, or the eyepiece, according as he is already known to be hypermetropic, or myopic, or tentatively in either direction, if the visual deficiency has not been ascertained. When the observer's eye has seized upon the image on the object glass, the point where the diffusion of the image commences to become permanent (that is, at the extreme limit of facultative adjustment) is marked as the *punctum remotum*. On consulting the scale one notes the division corresponding to the index on which is marked the form and degree of spherical refraction, from which may be ascertained the number of the glass necessary for correcting the focal aberration.

To find out the amount of the deficiency of accommodation in presbyopia, hypermetropia, and paralysis, the glasses should be arranged so that the object can be very distinctly seen. Then the concave lens should be moved towards the eye-piece till the object begins to become confused. This is the *punctum proximum*.

The scale on the outside of the tube at the division corresponding to hypermetropia is graduated in the same proportions as that allotted to myopia.

2. In determining the character of astigmatism, the object used for examination is a plate with alternate dark and light lines of equal thickness. This object may be rotated by means of a cylinder at the end of the tube. By this rotation we ascertain the meridians in which the image is best seen. The cylinder is graduated to indicate the meridians, by means of which the direction of the astigmatism may be ascertained.

To complete the determination of the question, we ought to ascertain the *punctum remotum* of the two meridians which differ most in refraction. The difference between these two results represents the form and degree of astigmatism.

M. Dieulafoy* has contrived an instrument very useful both in diagnosis and treatment, which he has called the subcutaneous aspirator. In those difficult cases where it is of importance to recognise the presence of suppuration in the muscular tissue, under the aponeuroses, or in the interior of organs, such as the liver or kidney, we have to resort to the exploratory trochar; but this instrument has the inconvenience of being at once too thick and too slender. Such objections cannot be made against the new instrument.

* Dieulafoy: Note sur un aspirateur sous-cutané. ("Gazette Hebdomadaire et Bulletin Général de Thérapeutique," 1869.)

The aspirator is composed of a syringe guarded by two stopcocks, and of a trochar and canula so slender that they can be thrust into the most delicate organs without any greater inconvenience than that caused by an acupuncture needle. This instrument, the canula of which has two slits at the end, is introduced in quest of the suspected fluid. On a vacuum being made by means of the piston of the syringe, if any fluid exists some of it is withdrawn.

This method of exploration suits all collections of fluids, whether serous, sanguineous, purulent, urinary, or encysted.

The aspirator may be used in evacuating effusions from the joints without the danger of introducing a single bubble of air. Nor is there any danger of inflammation following the puncture. Could it not also be used in effusions within the pericardium, in retention of urine where catheterism has failed, in encysted pleurisy, and in chronic abscesses?

As the two stopcocks may be kept open and shut by turns, the evacuation of the liquid can go on without interruption, and liquids, such as tincture of iodine and alcohol, can be injected, if thought necessary, without taking out the canula, being sucked up by the inferior chamber of the syringe.

The subcutaneous aspirator can also be used to withdraw gas in obstructions of the bowels, and even in bleeding, by inserting the needle into a vein, or artery, or in draining congested parts, such as swollen and strangled hæmmorrhoids.

M. Vulpian* has made some important remarks upon fatty degeneration of the small arteries of the ends of cut nerves. In experiments made upon rats and field-mice the author has observed that the vessels of divided nerves undergo a kind of granular degeneration of their outer walls, forming a sort of sleeve added to the healthy trunk. While the arteries undergo this modification, which gives them a darker appearance than usual, the veins remain unaffected. M. Vulpian has observed this alteration in the arteries two or three months after section of the sciatic nerve. It still persisted after the fatty granulations caused by the fatty and granular degeneration of the nerve-tubes had completely disappeared, and when nerve-tubes containing the white substance of Schwann could be found at the end of the cut nerve. There was no alteration in the arteries of the muscles which the nerve had supplied.

* Vulpian: Altération graisseuse des artérioles du bout periphériques des nerfs coupés observé dans certains cas. ("Archives de Physiologie," 1870.)

M. Vulpian also observed this alteration in the minute arteries of the vagus nerve of the same animals. He also found in one case the same alteration in the extremities of the vagus, in its hepatic branches, and those which interlace with the solar plexus; but the arteries of the trunk of the nerve between the bronchi and the diaphragm did not appear to be altered.

This alteration was not always found; it did not exist in the sciatic nerve of young rats two months after the removal of five millimetres of the sciatic nerve. In these cases the two ends of the nerve were united by new nervous tissue.

Therapeutics, Materia Medica and Pharmacy.

From the time of Biett, who had adopted from English physicians the use of arsenic in skin diseases, this remedy has come much into vogue. It is now recommended in a great variety of maladies, such as intermittent fever, phthisis pulmonalis, asthma, chorea, epilepsy, angina pectoris, whooping-cough, chronic rheumatism, dyspepsia, diarrhœa, cancer, and cholera. This great diversity in its use leads us to believe that like almost all useful medicines, arsenic has its day of fashion.

Though so much used, the rules for the administration of arsenic do not seem to be yet fixed. M. Devergie* shows that in prescribing arsenic little distinction is made between its different preparations, and that the same dose is almost always given from the beginning to the end of the treatment.

It is not very reasonable indifferently to prescribe the same doses of arsenious acid in pills or powder, dissolved in water, or in combination with potash, soda, and ammonia, or the arseniates of potash, soda, and ammonia in solution, or in cigarettes, and even the insoluble arsenite and arseniate of iron.

Arsenious acid occurs in three forms: in vitrified pieces; in powder more or less coarse; and in very fine powder.

M. Devergie draws the following lessons from what he has observed in cases of poisoning.

1. Arsenious acid, in pieces, or in coarse powder, does not in general act upon the body till it is absorbed.

2. Arsenious acid, in fine powder, acts directly on the stomach and intestines, and also on the system when absorbed.

3. In spite of what has been deduced from many experiments

* Devergie: Des modes différents d'action de l'arsenic suivant son état physique ou ses combinaisons. ("Bulletins de l'Académie de Médecine," 1869; "Bulletin de Thérapeutique," 1869.)

upon animals, facts which I have observed in suicide and criminal poisoning, as well as in the medicinal use of arsenic pushed to *saturation*, have convinced me that there are two distinct ways in which arsenic acts. It acts directly on the organs with which it comes in contact, and it acts generally upon the economy when absorbed.

4. In using arsenious acid as a remedy in the solid form, we ought to remember that there exists a considerable difference between the acid in the form of coarse vitrified powder and impalpable dust.

If arsenious acid be given in solution its action varies with the amount of the solvent.

Arsenious acid, as experiments prove, if given in a state of combination with another substance, acts much more energetically; therefore, in prescribing arsenious acid, and in prescribing Fowler's solution (which is arsenious acid, but in a state of combination much more active in its effects), if we give the same dose of both, we are administering two preparations of different activity. It is certain that we may give arsenious acid either in the solid state or in solution in considerably larger doses than that of Fowler's solution.

From this we may conclude:—

1. That the activity of arsenious acid in the solid state becomes greater by minute division, and that the dose ought to vary with the degree of division in which it is administered. But as we are never sure of the fineness or coarseness of mechanical trituration, it is best not to employ arsenious acid in the solid form.

2. Arsenic, when given in solution, varies in the energy of its action according to the amount of fluid in which it is dissolved.

3. Not only is the action of arsenic modified by the form in which it is given, but when it enters into combination with an alkali to form a new salt, its energy is increased instead of diminished, as is generally the case with bodies possessing caustic properties.

4. When arsenic is combined with oxide of iron, the result is an insoluble compound, whose effects upon the body are much milder, so that to produce the same effects the doses ought to be larger. The same is the case with arseniate of iron, which is also insoluble.

With regard to the manner of administering arsenic, M. Devergie remarks a great diversity in the prescriptions used, and thinks it a mistake to continue to give arsenic without success in unvarying doses. Arsenic should in general be given in progressive doses.

Some physicians order arsenic to be taken on an empty stomach;

others along with the food. M. Devergie considers this latter practice erroneous. From thousands of experiments upon animals, it has been established that medicines of every kind, especially those which are capable of being absorbed, have their action much weakened when mixed with alimentary substances.

It is generally agreed that in treating lead-colic there are two indications to hold in view—to calm the intolerable pain, and to combat the obstinate constipation. But in giving opium to alleviate the pain, we increase the constipation. It is to avoid this inconvenience that M. Bourdon* has had recourse to subcutaneous injections of morphia. He commences by injecting about half a grain of muriate of morphia, which makes the pains cease in eight or ten minutes; whilst the patient is under the influence of the morphia, he gives half an ounce of castor oil with two drops of croton oil or an emetocathartic, if that be thought necessary. At night a second injection is made which procures a quiet sleep.

The next morning a third injection is made, and during the day the patient takes four or five drachms of sublimed sulphur mixed with equal parts of honey. This generally obviates the constipation. After three or four days of this treatment, the pain in the abdomen and the constipation disappear. In order to remove the other effects of lead-poisoning, sulphurous baths are used in alternation with baths of soap and water, and sulphuric acid is given by the mouth. If the general health be low, quinine and iron are given.

In persons exposed by their employments to lead-poisoning, the skin holds a portion of the lead with which it is impregnated, in the form of sulphuret; hence the brown tint given to the cuticle, which is deepened by the use of sulphurous baths. The skin, it may be remarked, like other albuminous compounds, contains about one per cent. of its weight of sulphur. This brown tint of the skin is especially marked in workmen who neglect the duties of cleanliness, The fumes of lead which incrust the unwashed skin are absorbed in variable quantities. It is the duty of the physician to preserve the economy from such poisonous influences. To obtain this object, M. Méhu† uses baths of muriate of soda prepared in the following manner:—

* Bourdon: Sur le traitement de la colique de plomb par les injections hypodermiques de morphine associées aux purgatifs. ("Société de Thérapeutique, Gazette Médicale de Paris," 1869.)

† Méhu: De l'emploi de l'hypochlorite de soude dans le traitement externe des malades atteints d'affections saturnines. ("Bulletin de Thérapeutique," 1870.)

Of dry chloride of lime, twelve ounces and a half; crystalised carbonate of soda, twenty-five ounces; water, two gallons and a quart. Dissolve the chloride of lime in a portion of the water; this may be done by triturating it in an earthen mortar containing water. The water is poured off again and again, and strained through a cloth, to separate the undissolved particles. When the water has taken up as much of the chloride of lime as it can dissolve, make a solution of crystallised carbonate of soda with the remainder of the two and a quarter gallons of water. This will cause an insoluble precipitate of carbonate of lime, muriate of soda remaining in solution. Now pour this solution into a wooden or zinc bath of ordinary capacity, and cover the smell of chlorine with twenty drops of the essence of lemon dissolved in alcohol.

The patient ought to remain about half an hour or three-quarters of an hour in the bath, rubbing the discoloured skin with his hands or with a brush.

No disagreeable effects result from the bath, one of which is sufficient to clear the outer stratum of skin of all traces of lead, while a bath of soap and water would have had very little effect.

The skin when impregnated with the compounds of lead is dry, stiff, and gives a disagreeable sensation to the patient, which becomes more marked after a sulphurous bath. On the other hand, baths of muriate of soda make the skin supple, and confer upon the patient a pleasurable feeling.

When it is only the hands and arms that are discoloured, a wash may be used of somewhat greater strength. M. Méhu recommends ʒiii and ʒi of chloride of lime, and double that quantity of carbonate of soda to four quarts of water.

The muriate of soda in contact with the salts of lead, transforms them into chloride of lead, which is soluble in 130 parts of cold water, and still more soluble in the alkaline muriates. But when the salt of lead exists in the form of black sulphuret, the muriate, by giving up a portion of its oxygen, changes it to sulphate; then, by a double decomposition of this insoluble sulphate with the chloride of soda, chloride of lead is produced. This compound, which is very soluble, remains dissolved in the chlorinated liquid.

From an observation of M. Lanceraux* it would appear that death impending from the poisonous effects of gases issuing from *fosses*

* Lanceraux: Empoisonment par les gaz des fosses d'aisance, disparition rapide des accidents aigus par l'emploi des inhalations d'oxygène. ("Société de Thérapeutique en Gazette Médicale," 1870.)

d'aisance may be averted by the inhalation of oxygen. Here is a case in point:—

Several men working at one of these receptacles fell down asphyxiated from an escape of gas through a crack. One of them was carried to the hospital, which he reached apparently in a hopeless condition. His face was blue; his cheeks and limbs icy cold; he was deprived of sensation to such a degree that ammonia applied to the nose had at first no effect; he cried out incessantly; his arms were firmly contracted across the chest, while the legs were relaxed. The pulse was slow and feeble. Coffee and wine were given, and mustard poultices applied to the body and legs without any result. His life appeared to be still in danger, when it occurred to M. Lanceraux to make him breathe oxygen gas, some of which he had ready made. After breathing the gas for some minutes, the patient felt relieved; the spasms in the chest disappeared, the blue tint diminished, sensation returned, and the bodily temperature was slowly restored.

M. Besnier* has found a simple method of treatment so successful in orchitis of all kinds that he thinks it proper at once to submit it to the consideration of other medical men.

The patient is kept at rest, the scrotum is raised, and compresses steeped in a concentrated decoction of the leaves of digitalis are kept constantly applied. The compresses applied may be either lukewarm or cold, and are taken off when they begin to dry. The application must be kept on incessantly. With some folds of cloth under the pelvis and some water-proof around the wet compresses, the application can be carried on with little inconvenience to the patient.

At a meeting of the Société Médicale des Hôpitaux, M. Chauffart† claims to have had favourable results from the use of carbolic acid in large doses in the treatment of confluent small-pox which had reached the secondary stage, fifteen grains of crystallized carbolic acid to be taken in a diluted state in the course of the twenty-four hours.

In five very severe cases in which this remedy was tried, its use was followed by a rapid improvement in the febrile symptoms and the course of the suppuration of the vesicles, and this at a time

* Ernest Besnier: Sur le traitement de l'orchite par les applications externes de compresses imbibées d'infusion de feuilles de digitale. ("Bulletin de Thérapeutique," 1870.)

† Chauffart: Société Médicale des Hôpitaux. ("Union Médicale," 1870.)

when the cases seemed likely to run to a rapid termination. One of the patients who underwent this treatment died suddenly fifteen days after the cessation of the symptoms of small-pox. At the time of his death he was able to sit up, and was on full diet.

The dose of fifteen grains of carbolic acid may be continued for eight or ten days without any accident, and without injury to the stomach or even disgust on the part of the patient.

M. Chauffart combines with the internal use of carbolic acid its outward application in the form of lotion (one part of the acid to one hundred or a hundred and fifty parts of water). This is applied to the skin sometimes from the first appearance of the eruption.

The introduction of carbolic acid into the treatment and prophylaxis of a number of diseases makes us welcome any experiments throwing light upon its physiological actions, the doses which should be used, or the manner in which it should be given. On these points MM. Paul Bert, and Jolyet * have drawn the following conclusions from their experiments :—

1. Carbolic acid diluted with thirty parts of water and in a dose sufficiently large to be mortal (three or four grammes for dogs of medium size) causes convulsions with irregular tremors. This is due to excitement of the sensitive cells of the spinal cord, for it is found that in section of the motor nerves, or the administration of chloroform, these effects no longer appear.

2. Death is the consequence of this exaggerated excitation. Its proximate cause is a diminution in the respiratory movements and the action of the heart.

After death the motor nerves and the muscles preserve their properties; but the *rigor mortis* comes on very quickly on account of the exaggerated muscular contractions.

3. Given in a stronger dose (six or seven grammes) carbolic acid causes sudden death without any convulsions by arresting the action of the ventricles of the heart. Red blood is found in the cavities of the left side of the heart.

4. In a smaller dose (two to three grammes) the animals, after convulsions lasting for three or four hours, regain the appearance of perfect health. Frequently, however, inflammation of the lungs, cornea, and conjunctiva supervene a few days after apparent recovery, the eye bursts and the animal dies.

* Paul Bert et Jolyet: Recherches sur l'action physiologique de l'acide phénique. ("Société de Biologie.") ("Gazette Médicale de Paris," 1870.)

5. Small doses (one gramme) may be administered without any inconvenience during several months.

6. Subjects become accustomed to the action of carbolic acid in larger doses than at first. This toleration has certain limits; for example, we cannot give dogs more than six or seven grammes without causing death.

It is not easy to study the physiological action of bromide of potassium. Give it to a dog, even through the œsophagus tube, he almost immediately returns it, To inject it by the skin it must be diluted by a large quantity of water, and even then its local action is sufficiently severe to cover or complicate the action of the drug upon the system.

M. Laborde* has tried the effects of this now fashionable medicine upon animals, and upon himself. He has given bromide of potassium in large doses (fifteen grammes) in order to test its physiological, as well as its therapeutic effects, having enjoyed the questionable privilege of making experiments upon his patients.

We reproduce the conclusions which M. Laborde has reached.

In man, as in animals, bromide of potassium has a predominant, and, therefore, elective influence upon all reflex actions. It has a secondary action upon the phenomena under the control of the will and the intelligence. This secondary action is more marked in man than in animals, as in man the actions under the direction of the intelligence and the will are more intimately connected with the other motor functions.

In man, as well as in animals, the action of bromide of potassium commences with a period of excitement principally manifested in the functions which are attended by reflex actions (those of generation, secretion, and excretion). This is succeeded by a second period, of collapse, in which the same functions become depressed.

These manifestations are the result of the influence of the drug upon the excito-motor cells of the spinal cord and the ganglia of the sympathetic system, which are the centres of reflex action.

The hypnotic action of this drug is the indirect result of its sedative influence upon the spinal cord and sympathetic ganglia. Bromide of potassium shuts out external impressions, calms down the patient, and invites sleep, without directly causing it. This

* Laborde: Recherches experimentales sur l'action physiologique et thérapeutique des composés de potassium et du brome de potassium en particulier. ("Gazette Médicale de Paris," 1869.)

indirect and secondary action, if large doses be given, may become intense, profoundly modifying some of the faculties of the brain, the memory, for example, especially the memory of recent events.

Bromide of potassium differs from some other compounds, which also act upon the reflex functions. Whilst the bromide acts first upon the spinal cord, and then upon the encephalon, ether and chloroform act first upon the encephalon, suspending the intelligence, volition, and sensibility. They have only a secondary and intermediate action upon the spinal cord, as M. Claude Bernard has shown.

Belladonna and opium are almost the only anodynes and narcotics used in France, hyoscyamus and datura stramonium, formerly so much used, being now almost entirely abandoned. In order to ascertain if this neglect be deserved, MM. Oulmont and Laurent* have taken in hand a series of researches upon the active principles of these two plants. In their physiological experiments the animals used were frogs, rabbits, guinea-pigs, cats, and dogs. Hyoscyamine and daturine were either given directly or by subcutaneous injection.

These observers arrived at the conclusion that hyoscyamus and datura strongly resemble belladonna in their action, but that they are more easy to manage, and less liable to cause accidents, and that hyoscyamus, or, rather, its alkaloid, may be used for some purposes for which belladonna cannot be given.

Here is a *resumé* of the conclusions at which MM. Oulmont and Laurent have arrived.

1. Hyoscyamine and daturine have a special action upon the sympathetic system.

2. In small doses they diminish the capillary circulation; in large doses they cause a paralysis of the vessels.

3. The tension of the arteries is increased by the administration of small doses, but diminished by large ones. Section of the vagus nerve does not modify these results.

4. The pulse becomes weaker and more frequent.

5. Hyoscyamine renders the movements of the heart more regular, but daturine often causes them to become intermittent. In large doses both alkaloids diminish the frequence of the contractions of the heart, and in the end cause them entirely to stop.

6. The respiration is always accelerated.

* Oulmont et Laurent: de l'hyoscyamine et de la daturine étudiées au point de vue de leur action physiologique. ("Archives de Physiologie," 1870.)

7. Neither sensation nor motion is modified by these agents. In poisonous doses, however, sensation becomes somewhat deadened.

8. These alkaloids have no action either upon the irritability or structure of the voluntary muscles.

9. In small doses they increase the movements of the intestines, in larger doses they paralyse them.

10. The general phenomena observed after the administration of daturine and hyoscyamine are the result of changes in the circulation. They are of short continuance, as the alkaloids are quickly eliminated, especially by the kidneys, in whose secretion they may be detected.

11. The dilatation of the pupil is caused by excitation of the sympathetic nerves; the third pair has nothing to do with it.

12. Small doses generally raise the bodily temperature a little, while large doses diminish it.

Though many important works have recently appeared upon the physiological effects of the Calabar bean (physostigma venenosum), the researches of MM. Leven and Laborde* have given some important additions to the knowledge already acquired.

The principal object of their enquiries was the crystallisable principle of the Calabar bean, recently separated and studied by M. Vée, which has been named *Eserine*. The following are the conclusions at which these authors have arrived:—

The essential phenomenon of the physiological action of eserine is a tremulous action of the muscles.

All the muscles, both of organic and inorganic life, are affected by this tremulous action in one way or another, according to their nature and functions. There are tremors, starting of the muscles, and clonic contractions in the limbs, trunk, and head. There are oscillatory movements in the eyes, alternate contractions and dilatations of the pupil, ending in total contraction, with oscillation of the globe of the eye itself. The heart is affected by tremulous action and convulsive agitation. In the intestines there are continuous movements and nodi, with circular constriction towards the end of the canal. In the bladder there are contractions, with rigidity of muscular fibres round the neck.

Atony of the muscles attends or follows these tremulous movements.

They seem to be caused by the primary influence of eserine

* Leven et Laborde: recherches expérimentales sur l'action physiologique de l'ésérine ("Gazette Médicale," 1870.)

upon the spinal cord. It seems to be most powerful at the upper part of the cord, hence the contraction of the pupil.

At the same time there appears to be a secondary modification of the muscular contractility, since muscles separated by section from the spinal cord become the seat of this tremulous action, though only when the system is thoroughly under the influence of the drug.

Death seems to take place by asphyxia. The cause of this may be the morbid condition of the respiratory muscles, assisted perhaps by the altered condition of the *medulla oblongata*.

Neither sensation nor the power of the nerves to conduct the motor stimulus seem to be affected, save very slightly, by the action of eserine. The excito-motor function seems at first to be sensibly increased. The blood of an animal poisoned by eserine produces the characteristic effects of the drug, and may cause death.

M. Duquesnel* has obtained a compound of bromine with eserine, the active principle of the Calabar bean.

Bromine in aqueous solution combines with eserine, producing a crystalline bromide of eserine, or bromo-eserine, a compound formed by substitution, like bromocodeine, with a different proportion of bromine. A second compound may be obtained of a pale yellow colour amorphous and deliquescent, and even a third one of a resinous appearance.

To the first of these compounds M. Duquesnel gives the name of bromised eserine (ésérine bromée.) It is prepared by adding pure eserine in powder to an aqueous solution of bromine, till a yellow cloud is formed, which does not disappear. We thus get a slightly yellow liquid, which in a few instants takes a violet hue. We then filter and evaporate to dryness in a bath. From this is obtained, if the solution has not been over-saturated, a confused mass of colourless crystals. Their size is larger where great care is taken to measure the solution of bromine in nice proportions. The crystals are surrounded by an uncrystallised red substance, the result of the oxidation of a part of the eserine. Many other compounds of a brilliant colour may be obtained in a similar manner.

By pulverising crystals and washing them with distilled water at the freezing point, saturated with ether, we obtain in crystallisation a mass of colourless acicular crystals, or of minute semi-

* Duquesnel. Action du brome sur l'ésérine ("Bulletin Général de Thérapeutique," 1869).

circular crystals. These crystals are soluble in water, especially if hot; they are soluble in alcohol, from which they may be separated by evaporation in the form of fine needle-shaped crystals. They are insoluble in ether, chloroform, and in the fixed and volatile oils, and not very soluble in glycerine even when heated. They remain unaltered in moist air. Heat at the boiling point whitens them, and gives them a dull look. A higher temperature decomposes and chars them, when a very irritating vapour is emitted.

The aqueous solution of bromised eserine is not affected by the coloured tests. Ordinarily without colour, in a fortnight it begins to assume a pink hue, which deepens slowly. This new compound may be of interest to the oculist. It shares the properties of eserine and its salts. Like them it acts energetically in contracting the pupil; but whilst the other salts are always acid, bromised eserine is perfectly neutral, and has no local irritating effect.

M. Duquesnel proposes the following prescription in place of the salts of eserine:—

℞ Eserinæ Brominatæ gr. i.
Aquæ distillatæ ʒi.
Solve.

Two or three drops of this solution cause considerable contraction of the pupil, lasting more than six hours.

The great quantity of food used by birds, and especially the rapidity with which digestion takes place, has suggested the idea of testing if the mucous of the gizzard does not contain pepsin, like that in the stomach of the calf and other quadrupeds. M. Dannecy,* an apothecary, has found that this mucous, which dries quickly in the air and is easily reduced to powder, possesses the property of coagulating casein, and of digesting a much larger quantity of fibrin than the ordinary pepsin sold in the shops. It has been ascertained by actual experience that this powder, weight for weight, produces effects at least as favourable as those following the use of the pepsin of the calf.

M. M. Magnes-Lahens† has pointed out an improved way to make tar-water, based upon the property of tar, to undergo a very minute division with a sufficient quantity of clean dry sand.

* Dannecy: D'un nouveau mode de préparer la pepsine ("Bulletin Général de Thérapeutique," 1869).

† Magnes-Lahens: Nouvelle préparation de l'eau de goudron ("Bulletin Général de Thérapeutique," 1869).

Take fifteen grammes of tar to four hundred grammes of sand, mix them together, and put them into a tin cylindrical box holding a little more than a litre. This box has an opening at one end, at the other a reservoir with a hole, to which a tube may be fitted. Pour twelve decilitres of filtered water over the sand and tar; the water dissolves a certain portion of the tar and runs out slowly through the tube, which is of small calibre, in order to ensure a slow current. From these proportions of material a litre of tar-water is obtained. In order to have it of the same strength as the *eau de goudron* of the French Pharmacopœia, the tube should be broad enough to allow twelve decilitres of the water to escape in five minutes.

A work recently published by Dr. Dusart,* "Recherches expérimentales sur les propriétés physiologiques et thérapeutiques du Phosphate de Chaux," contains the following important results: —1. The phosphate of lime is a natural excitant of the functions of nutrition, by causing the albuminoid matter to form cells and by taking part in the organisation of tissues, becoming thereby a chief agent of nutrition. 2. A compound of lactic acid and phosphate of lime, called by Dusart Lacto-phosphate of Lime, is the best preparation for assimilation, and should be given as an energetic agent for improving nutrition and digestion. It has been tried with remarkable success in the treatment of dyspepsia, rickets, chlorosis, scrofulous disease, and in pregnancy.

Dr. Rabuteau prepared bromoform and bromal in a similar manner to that in which chloroform and chloral have been obtained —$C_2HBr_3O + KHO = CHBr_3 + CHKO_2$, or Bromal + Potash = Bromoform + Potassium-formate. The anæsthetic effects of bromoform and bromal are produced sooner and with smaller doses than is the case with chloroform and chloral. In manipulating with the crystals of the hydrate of bromal the lacrymal and nasal secretions become augmented (Gazette Hebdomadaire, 1870).

The assertion of M. Liebreich, that hydrate of chloral, coming into contact with the alkali of the blood, was transformed into chloroform and formic acid, according to the following formula:—

$$C_4HCl_3O_2, H_2O_2 = C_2HCl_3 + C_2H_2O_4,$$

was questioned by several French chemists. M. Personne,† however, from a number of experiments made with fresh blood, and

* "Union Médicale," Mai, 1870.

† M. Personne: "Comptes Rendus des Séances de l'Académie des Sciences," Nov. 8, 1869.

also with that of live animals, is convinced that M. Liebreich's views are correct.

Acetate of Methylamine being an ingredient of coffee, Béhiér and Personne have tried it in one gramme doses in several cases, and conclude that it increases the arterial tension and has little influence upon the frequency of the pulse; but when it is given in larger doses the pulse becomes irregular.*

Dr. Achscharumon having tried the physiological effects of aconitine, draws the following conclusions:—1. It is not absorbed by the skin. 2. It has no diuretic and no diaphoretic effect. 3. It should be given internally in such morbid conditions as make it desirable to lower the temperature, the action of the heart, or the pressure of the blood.†

There have long been differences of opinion about the dose and action of bromide of potassium, and on the effects induced by it when administered for a long time. It has been found difficult to explain the symptoms of iodism which have followed the use of large doses of bromide of potassium, the disagreeable effects it produces on some occasions, and the irregularity of its sedative action upon the system.

The researches of M. Adrian ‡ lead us to think that the contradictory results attending the use of this medicine may be, in some cases, owing to the presence of foreign substances modifying its action. Out of ten specimens examined by M. Adrian, only one was fit to be used in medicine, all the rest contained from ten to fifteen per cent. of foreign matter. Some samples had as much as thirty-five per cent. on the total weight. These adulterations consisted of potash in the free state or as carbonate, and combined with iodide, and chloride of potassium, sulphate and bromate of potash. The presence of these impurities was probably owing to a want of care in the making and purification of the salt.

M. Adrian gives the following directions:—To recognise the presence of these different impurities, dissolve ten grammes of the bromide of potassium in enough of distilled water to give ten cubic centimetres of solution. Divide this solution into ten parts. To one of these parts add some hydrochloride acid. Only a few bubbles of

* Annuaire de Thérapeutique, 1870, pp. 129—131.

† *Ibid*, pp. 57, 58.

‡ Adrian: Recherches sur le bromure de potassium au point de vue de sa composition et de sa préparation à l'état pur ("Bulletin Général de Thérapeutique," 1869).

carbonic acid should escape; an abundant escape indicates the presence of carbonate of potash, which ought not to be present in greater proportion than one per cent.

To ascertain the presence of iodide, add a gramme of benzine and some drops of bromine in water; if an iodide be present this will bring out a rose colour, whose depth is proportioned to the amount of iodide present.

We may ascertain the quantity of iodine by using a typical solution of known strength for comparison. It is necessary to abstain from adding an excess of solution of bromine, as it prevents the rose colour from being produced, and might make one believe that the iodine was absent.

To detect the sulphates, add a little tincture of baryta to the solution acidulated with nitric acid.

The bromides are indicated by the yellow colour produced by strong sulphuric acid.

After these first essays, and the complete separation of the carbonate and sulphate of potash, and also of iodide of potassium, we can determine by using a measured solution of nitrate of silver the proportion of chloride of potassium united to the bromide. The bromide of potassium may be purified from the sulphate of potash and the chloride of potassium by crystallising its solution again and again; but the separation of the iodine is so difficult that the only practicable way to get bromide of potassium free from iodine is to purify the bromine before commencing the manufacture of the salt.

M. Adrian recommends the following method of cleaning bromine from chlorine and iodine:—He shakes the bromine with water and a small quantity of ether. The bromic chloride is dissolved first, on account of its greater solubility in ether; it then decomposes into water, hydrochloric acid, and bromine. After repeated operations of this kind pure bromine is separated; it is recognised by the yellow colour assumed by the fluid.

The bromine is then shaken with a decoction of starch, which seizes upon the iodine, and then by distillation we get the element free from chlorine and iodine. Bromine thus purified is saturated with potash, known to contain no chlorides or sulphates; and the mixture of bromide and bromate is calcined in successive portions until all the bromate is reduced to bromide. Dissolve the salt in distilled water, crystallise and dry the crystals. The bromide of potassium thus obtained is pure enough to be used in medicine.

MM. Bobierre and Hebelin * state that, in order to detect the

* "Journal de pharmacie et de chimie," September, 1869.

adulteration of bromide of potassium with iodide of potassium, it is only necessary to place a few grains of the salt in question on paper previously impregnated with starch paste, to moisten it and to admit a small portion of chlorine gas. The iodine is thus set free, and the paper coloured blue. Another and perhaps a better test given by the same authors, is the use of bromide added to the salt after it has been placed under benzole; if the latter becomes red coloured, iodine is present.

M. Baudrimont,* having tested bromide of potassium for the presence or absence of iodide of potassium, gives the following directions for the removal of iodide if present:—About ten grains of the impure bromide are dissolved in a sufficient quantity of distilled water; a solution of bromide in water is then added in excess, this solution being preferable to bromine itself as being more manageable. The liquid is then heated to boiling, and kept so until no more vapours of iodine are given off. The liquid is next evaporated to dryness in order to eliminate the excess of bromine. In this way a bromide of potassium is obtained free from iodide, but which may yet contain chloride of potassium.

Sea air contains chloride of sodium. But does it always contain it or only sometimes? If only sometimes, under what conditions does it do so? These questions have been hitherto answered more by conjectures than by exact experiments. M. Gillebert Dhercourt† has made some observations which add to our knowledge of the subject. In order to ascertain the presence of sea salt in the atmosphere he has employed two contrivances. The first consists of a tub communicating by means of an india-rubber pipe with Gay-Lussac's saturation tubes, which contain a solution of nitrate of silver. M. Dhercourt afterwards adopted a more convenient apparatus, consisting simply of a flag or curtain of net, of a superficies of four hundred centimetres. This curtain was washed in distilled water exposed to the air for twenty-four hours, and then again washed. The water thus obtained, tested with nitrate of silver, always contained chloride of sodium in variable quantities. The author concludes from his experiments:—

1. That there is a zone on the sea coast where the atmosphere is constantly impregnated with saline particles.

2. The limits of the zone in which salt exists in the air appear

* "Moniteur Scientifique," October 15th, 1869.

† Gillebert Dhercourt: Recherches sur la présence du sel marin dans l'atmosphère maritime ("Union Médicale," 1869).

to be, in Monaco at least, from four to five hundred metres horizontally, and seventy metres in height above the level of the sea.

3. The amount of saline vapour in the air seems to be greater (ceteris paribus) the nearer we come to the surface of the sea. The proportion in which it occurs is increased or diminished by a rough or a calm sea, and by the direction and intensity of the waves; but it does not appear to be directly affected by the barometric pressure, the temperature, or the amount of moisture in the air.

M. H. Lossen* gives a new process for the preparation of nitric ether. Heat nitric ether S.G. 1.4 with nitrate of urea (15 grammes to the litre) to the boiling point, and leave it to become cold. 400 grammes of the acid are then taken and mixed with 300 grammes of absolute alcohol and 100 grammes of nitrate of urea. The whole distilled from a tubulated retort. When about half the contents of the retort has been distilled over a fresh portion of alcohol, and acid is added by means of a proper funnel tube, 100 grammes of nitrate of urea are sufficient for obtaining 7 litres of this ether.

In reference to the question, so often discussed the solubility of camphor in water, M. Jeannel† states that an alcoholic solution of camphor was made, containing ·375 grammes per cubic centimetre; and a litre of water at 15° does not dissolve more than ·75 grammes of camphor from this solution after twenty-four hours contact and frequent shaking. Alcohol does not increase perceptibly the solubility of camphor in water. Alcohol at 20° dissolves only 2·437 grammes of camphor, and at 35° it dissolves 6 grammes of that substance per litre of alcohol.

According to the investigations of MM. Grimaux and Ruotte,‡ the oil of sassafras, colourless when first rectified, becomes yellow by exposure to air and light. Density at zero 1·0815; a mixture of a dextrogyre hydrocarbon, and an inactive oxygenized principle, containing a very small proportion of a body which appears to be a phenol, and has the power of reducing nitrate of silver at the boiling point.

The hydrocarbon saffrene contains C_{10} H_{16}.

M. Lefort has made some experiments in the preparation of

* "Revue Hebdomadaire de Chimie," Mai, 1870.

† "Journal de Pharmacie et de Chimie," November, 1869.

‡ "Pharm. Journal," Seconde Série, tome xi., No. 6.

what he calls sulphocarbonic extracts of medicinal plants.* Moisture opposing a certain obstacle to the solvent action of the sulphide of carbon, the powdered vegetables are first to be dried at a temperature of 50° or 60°. The dry powder is then exhausted by maceration with several quantities of the sulphide successively applied, decanting and filtering the solution obtained. The exhausted vegetable powder retains about half its volume of the liquid, which can be recovered by distillation. The tincture obtained is distilled by means of a water-bath, the residue being freed from the last traces of sulphide of carbon by heating gently in the open air. When this has been entirely expelled, the odour peculiar to the plant is distinctly apparent. It is suggested that percolation may answer better than maceration.

A contributor to the "Pharmaceutical Journal" † reports his experience of the effects of various chlorodynes in a case which has been throughout under his notice. In course of time, the doses to be taken became so large that the cost of medicine began to be a serious consideration, and he was requested to devise some less expensive equivalent. By a process of elimination he found that morphia, chloroform and spirit were the only essential elements in the compound, and he thence infers that the efficacy of all the various chlorodynes is due almost entirely to morphia, slightly (and only slightly) modified by the chloroform; that chlorodyne is only a roundabout and disguised way of administering morphia; and that the same or very nearly the same effects would be produced by the equivalent dose of morphia.

* "Pharm. Journal," Seconde Série, tome xi., No. 10.

† "Pharm. Journal," Seconde Série, tome xi., No. 3.

NEW ZEALAND.

Report by WILLIAM G. KEMP, L.R.C.P. LOND., M.R.C.S. ENG., *late Surgeon to Nelson Hospital, &c., &c. (of Wellington).*

IN framing a report on the diseases of New Zealand, it may not be out of place, in the first instance, to state briefly the geographical and geological position of the group of islands known under this name. New Zealand consists of three islands, stretching from 34¼° to 47½° south latitude in the South Pacific Ocean, about 1,200 miles S.E. of Australia. The North Island is nearly 500 miles long, with a breadth varying from 5 to 300 miles. The Middle is 550 miles long, with an average breadth of 110 miles. The South Island has a triangular shape, and measures about 30 miles on each side. The North Island contains 26,000,000 of acres, the Middle 38,000,000, and the South 1,000,000; united, the whole group has nearly the same area as Great Britain. The centre of the North Island is occupied by broad and lofty mountains, which send off spurs to the coast in various directions. The valleys formed by these diverging mountain-ranges are at first gullies, which open out as they approach the coast into fertile districts, through the centres of which rivers flow, as Waikato, Waipa, Mokau, Wanganui, &c.*

Ruapahu, the highest mountain in this range, has an elevation of 9,000 ft., and its summit is covered with perpetual snow. Three lines of volcanic craters with high cones stretch across the North Island, one in the Bay of Islands, another at Auckland, and the third extends from Mount Egmont, near Taranaki, to White Island. Between these two last igneous points the district abounds in lakes, boiling springs, solfataras, tufas, and other volcanic products. The Middle Island is also traversed by a mountain-range, which commences at its northern extremity, and terminates in the south-west, after forming a sort of backbone to the island. The summit of this range is covered with perpetual snow, and has an elevation in some parts of 13,000 ft.; this portion has been called the Southern Alps. The South Island, like the others, is of a mountainous and wooded character.

* Dr. Thompson.

The general salubrity of the climate of New Zealand has now been established by the experience of years.* For persons of delicate constitutions, pre-disposed to disease of the lungs, it is, perhaps, unequalled. "Compared with Nice, one of the most celebrated continental climates, the climate of Auckland is *more temperate* in summer, *milder* in winter, *equally mild* in spring, and a little colder in autumn, with this advantage over all continental climates, that is not so liable to the very great variations of temperature common to them all from sudden shifts of wind." (Ex. Gov. Off.) The climate of New Zealand is doubtless less charming than that of Italy or the South of France, but it is certainly more salubrious, and probably better suited to the English constitution; for, though it has its share of wind, rain, and broken weather, it has the advantage over Italy and France in being more limited in range of temperature, embracing a less oppressive summer heat, and a more gradual change of temperature from month to month. There is more moisture in the atmosphere surrounding New Zealand than in that surrounding England. Proofs of its presence are given in the luxuriance of vegetation, and heavy night dews. Many of the Continental and Mediterranean climates are, during certain seasons of the year, finer, steadier, more agreeable than, and equally salubrious as that of New Zealand; but their summer heat is in many cases too great, their autumn frequently unhealthy, winter too cold, and spring objectionable from being liable to gusts of cold and chilling winds. There are few places to be found in all respects more suitable to the English constitution than New Zealand, and if that be so, then few more suitable for persons of delicate chest or lungs; the true theory being that for preventing the development of diseases of the chest, that is the best climate which will admit of the greatest and most constant exposure to the open air, and which is at the same time best calculated to promote the general health, a tendency to disease of any kind being best warded off by keeping the bodily system in a vigorous state of health. One of the peculiarities of this climate is the great difference which exists between the temperature of the day and night, there being a great and sudden change immediately after sunset. It is, therefore, dangerous for invalids, especially those suffering from pulmonary or rheumatic affections, to expose themselves to the cold night air. In my opinion this is a very fertile source of disease, which can be obviated in great measure

* For meteorological tables, see Dr. Kemp's Report in the first volume of this work, 1869.—(Ed.)

by the addition of extra clothing to compensate for the great change of temperature.

Diseases of New Zealand and its Inhabitants.

I have abstracted much of the following from Dr. Thompson's work on New Zealand, as it contains the clearest account of the diseases of the aboriginal natives. It will be seen (he says, referring to tables) that febrile diseases, generally of a low continued form, are three times more frequent amongst New Zealanders than amongst the English, a result attributable to their ill-ventilated sleeping huts, their poor diet, and insufficient clothing; consequently, many of the attacks might be prevented. Few of the sufferers die, but fever lays the foundation of other maladies. Ague and remittent fevers are unknown. Small-pox has not yet appeared in the colony, but the intensity of the vaccine vesicle, and the fatality of small-pox amongst the other Polynesian races, lead to the inference that the New Zealanders are strongly predisposed to the disease. Measles, an introduced disease, appeared in Otago in 1838, and did not then spread to the North Island; but in 1854 it broke out there, and proved fatal to about 4,000 natives. Scarlet fever appeared in Auckland, in 1848, among the settlers, but did not spread among the natives; but in 1854, during the prevalence of measles, several cases occurred amongst them. In 1864 a very severe epidemic of scarlet fever occurred at Wellington, which carried off numbers of children, and in many cases assumed a malignant character. Diseases of the lungs are more frequent among the New Zealanders than among the English. Consumption is the most prevalent form of this class of disease, and spitting of blood is looked on as a harbinger of death. Consumption is produced by the poor diet, ill-ventilated huts, and insufficient clothing of the natives, causes which act with much virulence on the constitutions of men originally formed to live within the tropics. Another, and, I think, very fertile cause of pulmonary affections is the acquired habit of wearing woollen clothing; for in this the Maori sleeps when perhaps it is wet through. In his native state no such circumstance could occur, the mat, which proved an effectual protection from rain, was thrown off, or, if worn, would not act in a manner so injurious as woollen clothing, not being saturated, as the latter would be, after rain. Diseases of the stomach and bowels are more frequent than among the English. Most of the attacks are of diarrhœa and indigestion,

and rarely produce death, although both assist in the development of scrofula and consumption.

Diseases of the brain are much less frequent than among the English. Apoplexy is a rare disease, though men have died suddenly, during cannibal feasts, from gluttony and excitement. Sudden deaths are rare. Temporary insanity, the result of acute and chronic diseases of the brain, and melancholy, produced by superstition are not unfrequent. Epilepsy is said to be unknown. Rheumatic affections are more frequent than among the English, a result attributable, among other causes, to careless exposure to the weather without suitable clothing; few of the attacks produce disease of the heart, but sometimes local palsy.

The venereal diseases are more frequent than among the English, owing, in great measure, to the dirty habits of the natives. The disease is generally mild, and yields to cleanliness and medicine. Men without noses are rarely seen, though secondary symptoms occasionally produce serious results.

Abscesses and ulcers are of frequent occurrence. Diseases of the eye, of a scrofulous nature, frequently occur, and sometimes terminate in partial or complete blindness. Cataract occurs in the aged.

Diseases of the skin are frequent, and, from want of personal cleanliness, the maladies are often inveterate. A peculiar kind of itch occurs among the natives, due to dirt, which generally assumes a pustular character, and is often very troublesome.

Scrofula is the curse of the New Zealand race; it is the predisposing cause of much of the sickness amongst the natives. In childhood it causes marasmus, fevers, and bowel complaints; in manhood, consumption, spinal disease, ulcers, and various other maladies. The remote cause of scrofula is "the constitutional tendency which the people inherit from having originally migrated from the tropics; the immediate cause is using potato diet for 300 days in every year, intermarrying with scrofulous persons, and living in huts worse than dog kennels." (Dr. Thompson.)

The disease among the New Zealanders called by them "Ngerengere," and described by Dr. Thompson under the name of lepra gangrenosa, appears to be a form of true leprosy. It commences with scaly patches on the extremities, extending over the trunk, and occasionally accompanied with cracks or fissures of the skin, and great local irritation. After a period of many months or years, the face, nose, lips, and eyebrows become swollen and shining, but without any tubercles; the eyelashes, hair, and whiskers fall out; the voice changes its tone, and the skin of the

whole body, and especially of the face, becomes pale and livid, but there is at this time no loss of sensation. Subsequently a small boil, blister, or dry crack appears along the flexure of the last joint of some of the fingers or toes, ulceration eats down, and eventually the phalanx drops off, generally with little or no uneasiness. In course of time another phalanx becomes separated in a similar way, and the process may be repeated until the whole of the toes or fingers are lost. This slow and gradual mortification sometimes involves the metacarpal and carpal, or metatarsal and tarsal bones. The general health may be but little affected, and the patients are usually cheerful and happy. The disease appears generally after puberty, and under thirty, and in scrofulous patients. The favouring causes of this "ngerengere" are probably the use of poor and bad food, neglect of personal cleanliness, and indolence of body and mind."*

In going round the wards of a New Zealand hospital, one is struck, not so much by new diseases, as by the prevalence of certain chronic old ones, dependent chiefly on the place of residence and occupation of the patients. I refer especially to chronic rheumatic, pulmonary, and dysenteric affections. Sanitary measures have brought the larger towns in New Zealand into something like a fair state, though much yet remains to be done, while in some of the digging townships they are absolutely nil. This, combined with contaminated water, bad liquor, and constant working in water (as is the case with miners), affords favourable circumstances for the development of such diseases. Chronic rheumatic affections sometimes become so confirmed as to resist treatment, though they generally yield somewhat under the continued use of iodide of potassium, only to return again when the patient is exposed afresh to circumstances favouring their development. One common complaint is sciatica, which is always very troublesome to cure, because those suffering from it continue to work on until they are obliged, from physical incapacity, to desist. I have found advantage from the continued use of alkalies and iodide of potassium, application of blisters to sacrum, frictions to leg and thigh, and occasional hot baths, combined with perfect rest for a time. Chronic dysenteric affections are also frequently troublesome, partly from being neglected at first, and from the patient being exposed, while suffering from the disease, to circumstances which would most likely produce it in a healthy person.

During my comparatively short stay in New Zealand (nearly

* Report on Leprosy, 1867.

two years), I have been struck with the number of cases of intestinal worms, which have come under my notice. The patients generally have been children, varying from one to eight or ten years old, though the affection is by no means limited to this age, and adults have been known to pass worms, sometimes of enormous size. Since coming to Wellington from Nelson, cases have come under my notice, much more frequently, of children being affected to such a degree as at first to cause alarm, though I have known of no fatal case. The greater prevalence of worms here is due in great measure to the different water supply of the two cities. Wellington is supplied badly, the only source being by wells, while in Nelson the chief, or, indeed, the entire supply is from a reservoir about three miles from the town, which is kept filled by a beautifully clear stream, which rises far away amongst the mountains surrounding the town. It then is evident that the water resources of the former are much worse than of the latter, and to this I attribute the greater frequency of worms in this city. In Nelson the ascaris vermicularis, or small thread-worm, was most frequent, while in Wellington I have certainly seen more cases of children being affected with the ascaris lumbricoides, or round worm, and frequently the two have coexisted. I have known the lumbricus to occur in a child nine months old, though it gave rise to no symptoms, and the passage of the worm was the first indication of its presence. I was told by a lady a few days ago that her baby, when six weeks old, passed a "bunch of worms like maggots," and had had nothing but breast milk. They are attended by the usual symptoms, frequently the child gets into a highly feverish state, which, however, passes off on the expulsion of the worm. The treatment I usually adopt is to give a powder consisting of 3 or 4 grains of santonine, and one of calomel for a child of five or six years old, at night, and a dose of castor-oil, if necessary, next morning; and, after two or three repetitions, all signs of worms will in most cases disappear.

Another troublesome and painful affection common in New Zealand is the frequent occurrence of boils. They are said to be most common in new settlers, but I have known them occur in those who have been for many years resident in the colony. They begin in the usual manner, as a small pimple, which gradually enlarges, until it becomes a genuine boil, and not unfrequently eight or ten or more will occur at the same time. Nitro-muriatic acid is used as a curative agent, and has frequently checked their recurrence. They are, as might be expected, found chiefly in those who are in a depressed state of health, and have been unduly exposed.

Diphtheria has several times broken out in New Zealand, but has not spread much, except under circumstances favourable to it. During the year 1868 it broke out, and proved fatal in many cases, at Blenheim, a town in the province of Marlborough; and again, a few months ago, in the neighbourhood of Wellington, in an asthenic form. It seemed to be most satisfactorily treated by the local application and internal administration of sulphurous acid. Locally, it was used in the form of spray every hour, and it was found, as Dr. McDonald informed me, that under this treatment the membrane became dissolved, and showed much less tendency to return than after application of caustics.

A disease which is growing in the colony is insanity. At present each province has its lunatic asylum, which is under the control of the Provincial Government; but owing to this system being in many cases found insufficient to meet the requirements of the separate provinces, a petition will, I believe, be laid before the New Zealand Parliament this session, asking for a central asylum for the whole colony, to which cases, likely to be of long standing, will be sent, the smaller provincial ones being still kept for temporary cases, such as bad cases of delirium tremens. The working of these smaller asylums (many of them, indeed, planned for some entirely different purpose) is on the whole unsatisfactory, owing to faulty construction of buildings, and want of experienced officers and attendants. The two causes which are most fertile in the production of this form of disease are the use of bad liquor and "shepherding." The greater number of patients received into the Nelson Lunatic Asylum (to which I held the office of surgeon for nearly two years) were diggers and publicans, and these classes of the community furnish the largest supply to most of our provincial institutions. A digging township is in all cases a most dangerous resort, and when we look at the immense quantity of bad liquor which is consumed even in the smaller ones, it is a wonder there is not more insanity, sickness, or crime than actually exists. The most common forms of insanity which have come under my notice have been acute mania, and religious melancholy; the latter often assuming an aggravated character, and being little amenable to treatment. The manner in which "shepherding" acts in causing insanity must be explained by the long continued solitude which shepherds on large sheep stations have to endure, seeing perhaps no human being, and having no other companion than their dogs for months together. This often produces a profound melancholy, which frequently lasts for a long time. From the Report of the Auckland Lunatic Asylum, for 1868, I see that the three

most common causes are intemperance, bodily ailments, puerperal conditions, taking them in the order in which they stand.

There are several hot and mineral springs in New Zealand, the chief of which are at Mahurangi, near Auckland, White Island, and in the Bay of Islands. Several have been used by the natives, on account of the properties they possess; but I do not know of their being used by Europeans. The following ingredients are found in them:—

The hot spring at Mahurangi:—Sulphuric acid, Chlorine, Lime, Magnesia, Silica, Potash, Carbonic acid and soda.

Mineral water, White Island:—Transparent, slight sediment, deposited in bottle, consisting mainly of gypsum in crystals. Hydrochloric acid, Sulphuric acid, Sulphurous acid, Alumina, Protoxide of iron with a little sesquioxide, Soda, Potash, Lime, Magnesia, Silica, Phosphoric acid and ammonia.

Mineral water from hot springs, Bay of Islands: —Protoxide of iron, Lime, Magnesia, Silica, Sulphuric acid, Hydrochloric acid, Sulphuretted hydrogen, Alkalies, Ammonia and Organic matter.

The above are taken from the Laboratory Book of the Museum of the New Zealand Institute, and the analyses were made by Mr. William Skey, of Wellington, the analytical chemist to the Institute.

Supplementary Report ON THE CLIMATE AND METEOROLOGY OF THE PROVINCE OF AUCKLAND.

By ROBERT TASSELL, M.D., M.R.C.S.E. (*of Auckland*).

THE province of Auckland, in the North Island of New Zealand, is situate between the 34th and 39th degrees of south latitude, and the 173rd and 179th east longitude, and comprises an area of 15,456,000 acres.

The soil is principally volcanic, very rich, and exceedingly fertile. In the neighbourhood of Auckland, and to the north, the country is undulating; but towards its southern boundary it is very mountainous, and extensive forests of the Kauri (auracaria excelsior) or New Zealand pine, and tea *tree* exist. Numerous extinct and isolated volcanoes are studded over the surface of the country, many of which may still be seen with craters almost as perfect as when they were in a state of activity.

The especial object of this paper, however, is to direct attention to the climate of the province, and with this view I have been enabled, through the courtesy of T. Kirk, Esq., Secretary to the

Auckland Institute, to give some meteorological reports (compiled by James Hector, Esq., M.D., F.R.S.), extending over a series of years, which doubtless will be found interesting to the reader, and more particularly to the physicians whose investigations are directed to the treatment of phthisis, and the various forms of bronchial affections for which cases this climate appears admirably adapted.

In furnishing these tables, I have taken the five principal stations for showing the monthly and annual means of temperature, and the annual mean of temperature of Mongonui, a small station at the most northerly point of the North Island. (See the tables, published in the first volume of this work, 1869: Report on New Zealand, by Dr. Kemp.—Ed.)

It will be seen, from the tables referred to, that the province of Auckland enjoys a far more genial climate than that of the Middle Island, or even of Wellington. The average mean temperature for the summer months in Auckland being 68°6′, and for the winter 53°3′, while that of Dunedin for the summer is 57°4′, for the winter 47°0′. The readings are made at sunrise, noon, and sunset. (For tables showing the mean annual rainfall in New Zealand, see Report for 1869 already referred to.—Ed.)

It will be observed by those interested in climatology that the climate of London is 7°2′ colder than that of the North Island of New Zealand; and, from the records above referred to, it will be seen that the *average difference* between the mean temperature of the warmest and coldest months of the year in New Zealand is 17°0′, while at Rome it is 27°, at Montpellier 33°, at Milan 38°, and at Jersey 22°.

This is an important fact, and not to be overlooked by the physician in selecting a locality as a health resort for his patient.

My own experience of the climate of New Zealand has hitherto been confined to the province of Auckland, and, without being prejudiced in favour of the province, I have no hesitation in affirming that the climate is all that could be desired. The air is soft, buoyant, and invigorating, and the fact of the mean range of temperature between the hottest and coldest months being only 17°, is sufficient in itself to indicate the freedom from those extreme changes which are so injurious to the health of the invalid. The Middle Island is frequently exposed to boisterous winds, and falls of snow during the winter months, while on the west coast of the island the rainfall is much greater than in any other part of the country.

I would recommend physicians, seeking a health resort for their patients, to try the effects of this climate—indeed, I would urge it

—not only for the reasons adduced above, but from several cases of incipient phthisis, and of bronchial and liver affections, that have come under my notice, I am enabled to bear testimony to the good results that have been derived from a short sojourn in this country. In some cases there has been a most marked improvement; languid, emaciated, and unable at first to take much exercise, they are now, after a few months' residence, capable of taking any reasonable amount, and even of enjoying a day's pheasant shooting. This sport may be indulged in to satiety, for the pheasant is as plentiful in many parts of the province as in some of the well-stocked preserves in England.

It is not to be supposed that I would advocate a residence here for a patient in the advanced stages of consumption; probably the voyage alone would finally break the already weakened thread of existence; the comforts of home with good nursing are far more suited to cases of this description.

There is one point which, I think, will prove interesting, viz., that I have not seen or heard of a single case of phthisis as having arisen among the European population. Some cases have occurred to the Maori race, and at this I am not at all surprised, seeing that they frequently sleep upon the damp floors of their *whares*, which are seldom impervious to the rain.

I may mention, by the way, that a medical gentleman suffering from tuberculosis, went to Australia, in 1838, for the benefit of his health; he returned shortly after to England, and in 1842 came to Auckland for the same reason. From that time up to the present he has been constantly in practice, and has, to the best of my knowledge, enjoyed tolerable health; he has now retired from the profession through advancing years and declining health, the old symptoms again showing themselves, although they appear to be in a chronic form. The long immunity this gentleman has enjoyed from active disease appears to me to be worthy of record.

One important fact is that the phthisical patient is always able to be in the open air. The winter, if I may so term it, is not unlike the English months of May and June; indeed, I have not observed the thermometer to be below 50° during the season which is the coldest period of the year.

I have frequently noticed that during the late rainy season my aneroid has stood as a rule very high, and, with one or two exceptions, always *above* "fair," say $30\frac{2}{10}$ inches. I thought it to be out of order, with so much rain, but comparing it with some of the best instruments, I found it to be very accurate. The only way in which I can account for it is that the rain comes in passing showers

exceedingly heavy at times, and then clears up, not unlike April weather in England. The weather is very treacherous in this way, the bright sun and clear atmosphere inviting one out, only to get a wetting in half-an-hour, unless you take the ordinary precaution of coat and umbrella. The rain is seldom continuous even for a day, and it is only when a severe thunder-storm or unusually boisterous weather occurs that I have noticed any fall in the barometer worthy of note.

The long sea-voyage might be thought to be injurious in many ways to the invalid. The confinement on ship-board, mode of living, &c., do not seem to counteract the beneficial results derived from the constant exposure to the pure sea-breeze. They usually gain flesh, have a good appetite, and do much towards building up a weakened constitution. I have myself made three voyages to Australia and New Zealand, during which I was associated with a large number of passengers (on an emigrant ship), and I can safely assert that the voyage had a most beneficial effect upon all chronic cases, more particularly those of chest-disease, struma, rheumatism, and complaints of the liver.

Before closing this paper it may not be out of place to make a few comparative observations upon the climate of Australia. This climate has been eulogised by different writers as being exceedingly healthy. Undoubtedly there are localities, some 2,000 feet above the sea, that can boast at certain seasons of a cool and refreshing breeze; but the summers are universally hot, the thermometer registering 90°, and not unfrequently above that during the greater part of the day, and during the prevalence of the "hot winds," which blow from the sandy deserts of the interior; I have myself observed it to stand as high as 108°. The country is also subject to protracted droughts, followed by heavy floods. Upon a healthy individual the climate seems to produce no injurious effects; but from a residence of six years, during which I have travelled through most of the colonies, and spent a considerable portion of that time in Victoria, New South Wales, and Queensland, I think I may venture to say that it is quite unsuited to the invalid. Carbuncular boils are of frequent occurrence, as I can myself testify by painful experience, and ophthalmia is so common a malady during the summer months, that the colonists have termed it "the blight." In my opinion, the climate is too enervating for the phthisical, and those suffering from congested or torpid livers. It produces copious perspirations upon the least exertion. The nights are also hot and oppressive, and the winters cold and wet, accompanied by frost; with the exception of Queensland, which is

favoured with a more temperate atmosphere at this time of the year.

I append the notes of a case in which ovariotomy was successfully performed by me this year:—

A lady, æt. forty, had always enjoyed good health, with the exception of occasional attacks of hysteria. In October, 1869, she found herself increasing in size, and thought she was pregnant with a fourth child. The tumour continued to increase, and her health good, until the 16th of January, 1870, when she was seized with violent pains, followed by an acute attack of inflammation. For two months she was confined to the bed and couch, under the care of a homœopath, who promised to *disperse* the tumour. At this time, 19th March, I was requested to see her; she was much wasted, and her general health a good deal impaired. Pulse 100, feeble. Having made an examination externally, as well as *per vaginam*, I came to the conclusion as to the nature of the case, and in conjunction with my friend, Mr. Stockwell, who had also seen the case, recommended that an operation should take place without delay. Early on the morning of the 26th, the day fixed for the operation, I was hastily summoned to my patient, as it was thought she was dying. I found her in a state of collapse, blanched face, and cold extremities, pulse scarcely perceptible. By friction, hot water bottles, and stimulants she slowly rallied, recollecting nothing but a great sense of suffocation some hours previously. It was quite evident that one of the cysts had given way (the tumour being thought to be multilocular), the size and shape of the abdomen being much altered, and fluctuation more perceptible.

Of course, the operation had to be abandoned, inflammation quickly set in, and I thought my patient would not survive many hours. Having a good constitution, she ultimately overcame this disaster with ordinary remedies and good nursing, and at the end of a month was in as good health as before the accident happened. It was now again resolved to operate, as the turning point of her strength seemed to have arrived, a general uneasiness and nausea becoming apparent. The operation was conducted upon the same rules as those laid down by Mr. Spencer Wells; yet it is necessary the details should be briefly alluded to on account of the very interesting nature of the case, and character of the tumour.

The usual incision having been made from the umbilicus to within two inches of the pubes, and the tumour exposed, the trochar was then introduced into the cyst, but without the slightest quantity of fluid escaping. On enlarging the opening, and passing my finger, I found what seemed to be numerous septa, or irregular cells, varying in size from a walnut to an egg, some containing a thick grumous fluid, others pus. These cells had to be broken down by the hand, and the fluid sponged out, much of which escaped into the cavity of the abdomen, before the mass could be removed. A cyst, containing about two quarts of the usual clear ascitic fluid,

was previously drawn off. The clamp was now applied, and the tumour finally cut away. The tumour, with contents, filled about half an ordinary pail, and weighed nearly 20 lbs. The cavity of the abdomen was thoroughly sponged out, even to the lower part of the pelvis, and the wound brought together by acupuncture pins, the pedicle being fixed in its lower part. A solution of carbolic acid was applied to the part, and over this was spongiopiline wrung out of hot water, while a four-tailed flannel bandage supported the abdominal walls. The patient was now placed in bed, the operation having occupied one hour and a-half from the first administration of the chloroform. An enema of gruel, containing 3s. tinct. opii was administered. Pulse 110, very feeble.

For the first three days the patient suffered from extreme prostration, and frequent sickness, unable to take any nourishment whatever. Beef-tea and gruel were administered twice daily by enemata, and the bladder relieved by catheter night and morning.

On the 1st May, three days after operation, the pins were removed, and on the following day the clamp and pin transfixing the pedicle were also taken away, a whipcord ligature being alone left, as the pedicle was found to be fast sloughing away. The wound was entirely healed without the slightest suppuration, a slight scratch down the median line was the only appearance left. Half a wine-glass of brandy, with the same quantity of water, was given every six hours, as the prostration continued. Not the slightest appearance of inflammation. The brandy seemed to have a marked effect; she now began to take food, but the enemata were still continued, and the pedicle was dressed twice a-day with dilute carbolic acid.

May 8th, ten days after operation. Bowels open for first time by injection. Copious evacuations. Gaining strength slowly. Pulse 100 feeble. Takes beef-tea, arrowroot, and jelly freely. Enemata discontinued.

May 12th. Removed to her couch for the purpose of having her bed made. Catheter discontinued. No symptom of inflammation. Pulse 90.

May 26, one month from operation. Able to be removed to drawing-room, and take her food as usual. She is still unable to sit up, but is rapidly gaining flesh, and occupies her time knitting, &c. Pulse and bowels regular.

June 23. Still continues to improve, and is able to walk from one room to another, although it will be some time before she recovers her former strength and health, in consequence of the previous extreme debility, the shock to the system by the bursting of the cyst, and the subsequent protracted operation, which mark the characteristic features of this very interesting case.

It should have been stated there were very firm adhesions between the anterior wall of the abdomen and the cyst. The peritoneum was also very much congested, presenting a dark red colour, particularly that covering the abdominal parietes, and the small intestines. About two quarts of sanguineous fluid, from ruptured cyst, were sponged out of the abdominal cavity, during

which some portion of the intestines unavoidably escaped; these were carefully returned, and the omentum *neatly* spread out over them, which had itself become partially rolled up during the manipulations. Of course, flannels wrung out of hot water were constantly kept by my medical friends (who kindly assisted me during the operation) in close proximity to the wound, supporting the abdomen at the same time. The temperature of the room was 74°, and hot water vessels were placed about the apartment.

The principal points of interest in the case are:—

1. The debility of the patient, rendering the success of the operation very doubtful; but considering the good constitution, and general tone of the system more in her favour than actual loss of flesh, it was urged that the operation should take place, rather than abandon her to her inevitable fate.

2. The nature of the parent cyst. This was entirely different from what I have understood to be usually the case in ovarian disease. It presented very much the appearance of a honey-comb, the cells containing pus and thick glutinous fluid. These required some degree of force to break down, in order to evacuate its contents before the mass could be removed, although the external incision had been enlarged to the extent of two inches.

Extract from a Letter from DR. KINGSLEY (*on board the Earl of Pembroke's Yacht*) *to* DR. TASSELL.

I think the best proof of the high estimation in which I hold the climate of New Zealand is the fact of our return to it from Europe, after a year and a-half's experience. As nearly the whole of that time was spent on board a yacht, my opinion must be taken with some caution; at the same time, that very fact is not without its value, as the exposure to the weather is infinitely greater than it would be to the resident on shore. I candidly confess that I think that New Zealand possesses the finest climate, "year out and year in," in the world. I believe that I have visited all the sanatoria of Europe, with the exception of Madeira; I am intimately acquainted with Algeria and Egypt, and I decidedly give the preference to New Zealand. Algeria and Egypt, pleasant enough in winter, are simply uninhabitable in summer, and Egypt, indeed, is *most* dangerous in May, the very month when we often require a particularly fine climate for our English patients. I doubt not but that there are some cases of consumption which would be more benefited by the dry desert air of Egypt, than by the moister breezes of New Zealand, but *that* can only be enjoyed for four months of the year. The range of climate, from Dunedin to Auckland is very great, and with the greatest ease an invalid can regulate his temperature to a nicety, going *south* for the summer, and returning *north* for the winter, if, indeed, there be a time in the North Island worthy of the name winter. We have never till this year had a stove in our cabin, and now have introduced it more for the sake of *drying* than warming. We sleep,

always, with the cabin skylight open and the night air blowing freely in, and we have very rarely found that more than one blanket was required. Of course, I should not recommend the sending out to New Zealand cases of consumption in an advanced stage; such cases are far better amongst the comforts of home, and the attention of friends; but in the commencement of the disease, where there is plenty of sound lung left, and considerable power of taking exercise, I can hardly imagine a better climate than the elastic breezes of the Hauraki Gulf *during winter*, and a summer spent on board a yacht is absolutely delicious. I know, from personal experience, that it is admirably suited to some diseases of the liver, having arrived here in the last stage of emaciation (from a severe attack of acute inflammation of that organ, followed, I believe, by abscess, caught at Alexandria), unable to walk thirty yards, and in constant pain, whereas I am now heavier than I ever was before in my life, and capable of holding my own in the bush with most men of my age. As a sanatorium for India, I should consider New Zealand in the highest degree valuable, and the ease and comfort with which it is now reached from the Point de Galle gives it an enormous advantage over any place I know in the northern hemisphere. I have also no doubt but that the time is not very far distant when those most marvellous hot springs and geysers, which so thickly stud the North Island, will be visited, not only for their indescribable beauty and grandeur, but for the curative effect of their waters, and that before many years are over the wild shores of Zota, Rua, and Rota-Mahana will be studded with gigantic hotels, as thickly as the thermal springs of Germany. Of course, you, who have been practising on shore will be able to give an infinitely more valuable opinion as to the value of the climate of New Zealand in different diseases than myself, as I have been merely cruising about its waters, and seldom seeing any disease more serious than a rheumatic stock-keeper, or a dyspeptic wood-cutter; but I have, I believe, seen enough to justify my assertion that, taking it altogether, New Zealand has the finest and most agreeable climate of any country it has been my lot to visit.

July 14th, 1870.

Extract from a Letter to DR. TASSELL, *from* WM. EARL, ESQ., (*of Auckland*).

I came here with considerable misgivings, being aware of the prevalence of pulmonary complaints amongst the aborigines, and fearing also that the climate would prove too damp. In the latter respect I have been agreeably deceived, for I have found that the popular opinion on the humidity of the New Zealand climate is not borne out by the result of actual meteorological observations, which prove on the contrary that the average dryness of the atmosphere here is nearly as great as in Australia during the summer months (hot wind days excepted), and in winter very much

RANNERA, AUCKLAND, NEW ZEALAND.

Date.	Time.	Temp. Dry.	Temp. Wet.	Wind.	Weather.	
1869.		Fahr.	Fahr.			
Oct. 2	8 a.m.	58°	55°	S.	Fine.	No thunder during summer months, and no sultry heat.
„ 24	noon	70	67	N.	Rainy.	
Nov. 21	9 a.m.	66	57	W.	Fine.	
Dec. 22	7 p.m.	63	56	W.	„	
„ 24	noon	77	67	S.E.	„	
1870.						
Jan. 9	„	77	65	N.E.	„	
„ 17	10 a.m.	71	64	S.W.	„	
„ 20	noon	77	67	S.W.	„	
„ 21	„	68	59	S.	„	
June 26	sunset	57	55	W.	Showery.	
„ 27	9.30	56	54	W.	Fine.	
„ 28	„	54	51	S.W.	„	
„ 30	„	57	54	W.	Showery, and loud thunder.	
July 1	„	59	53	W.	Fine.	
„ 2	noon	63	58	N.W.	Showery, and thunder.	
„ 3	9.30	59	56	N.W.	Showery.	
„ 4	„	54	53	N.	Very wet.	
„ 5	„	53	47	S.	Fine.	
„ 6	„	60	55	N.	„	
„ 7	„	54	52	calm	„	Slight morning frost occasionally.
„ 8	—	—	—	—	„	
„ 9	—	—	—	—	Very showery.	
„ 10	9.30	52	49	S.	Very fine.	
„ 11	„	53	52	S.	„ „	
„ 12	„	47	43	S.S.E.	„ „	
„ 13	„	45	42	S.S.E.	„ „	
„ „	1 p.m.	52	46	S.S.E.	„ „	
„ 14	9.30	53	48	S.	„ „	
„ 15	„	50	47	S.	„ „	
„ 16	„	47	46	S.	„ „	
„ „	sunset	51	48	S.E.	„ „	
„ 17	9.30	48	45	calm	„ „	
„ 18	„	45	43	S.E.	„ „	
„ 19	„	47	44	S.E.	„ „	
„ 22	„	52	49	S.E.	„ „	
„ 23	„	55	53	S.E.	„ „	
„ 24	„	55	53	S.E.	Heavy showers.	

drier than the driest part of England, or than Arcachon, Biarritz, and Pau, in France. I have asked many people why they consider this climate damp, and the reply is almost invariably, "Well, it rains a good deal, and your boots and leathers soon get mouldy." It is true that it does "rain a good deal," but the rain mostly falls in heavy showers, and we have no long spells of drizzle; between the showers we have a sufficient proof of the dryness of the atmosphere in the rapidity of the change from muddy to dusty roads. For instance, yesterday morning we had heavy rain for several hours, and the roads were full of pools, and so bad that we could not go to church at 11 a.m., while at 6 they were perfectly dry, and scarcely a pool to be seen. I enclose an extract from my register of the temperature and weather during the last few weeks, being the depth of winter; also for a few days during the height of summer, both periods representing a fair average of the weather during the most trying periods of the year as regards temperature.

My health has improved very much during my residence here. I have not gained in weight, but feel much stronger, and have not had the serious hæmorrhages I had at home, and during my stay in Australia; the expectoration, which continued unabated in Australia, is very much lessened; and altogether, after trying many climates, I have come to the conclusion that this, of all, is the best for my case (chronic tuberculosis) and as we have neither the distressing heats of summer, nor the cutting winds of winter, as in Australia, I consider this climate highly preferable; indeed, as a permanent residence for the invalid, I know of no place in the world more suitable than the province of Auckland, as far as climate goes.

July 25th, 1870.

INDIA.

BENGAL. *Report by* C. MACNAMARA, *Medical Officer-in-Charge of the "Chandnie" Hospital, Calcutta, and Surgeon to the Ophthalmic Hospital.*

CLIMATOLOGY.

I shall have to refer to various points in connection with the meteorological influences of the past year when examining the circumstances of epidemic cholera in this Presidency, and may, therefore, with advantage pass on to the consideration of climatology as affecting the health of our British troops in India, a subject which is exciting unusual interest at present, in consequence of the prodigious sums of money being spent on barracks for their accommodation over various parts of the country. The cost of these buildings is being met by grievous taxation, which has raised a cry from the whole population of India, such as has never before been heard, and which, if continued, will most surely endanger our rule over this part of the world. There is, perhaps, no class of Europeans better able to judge of the depth and extent of this feeling among the natives than their medical attendants; in fact, we are the only class of Englishmen in India permitted to enter the family circle of the natives of this country, to know and understand them as they appear to one another.

To proceed, however, with the subject we are more immediately concerned with, and which resolves itself, in the first place, into the consideration of the comparative advantages afforded by the hills over the plains of India as places of residence for our European troops—what advance have we made lately towards the solution of this important question? It is said that old Hindoo Rao, of Gualior, remarked long since to a British officer near him, "What fools those English are! Had I such soldiers as they have I would place them on the hills, and keep them there in health and strength till I wanted them. When there was fighting to be done, I would bring them down on elephants, horses, and bullocks (by railroad), and let them loose upon the enemy like so many cheetas. What could stand before them?" This question

was discussed at length by the "Commissioners appointed to enquire into the Sanitary State of the Army of India" in 1863, and they came to the conclusion that the subject has two aspects, first, as regards health, second, as regards the military occupation of the country. They observe that "so far as health is concerned, the evidence in the stational reports is, with a trifling exception, in favour of the mountain climates, especially during the earlier years of service; hitherto, however, there has been no experience on any large scale of the sanitary influence of the hill-climates on our troops." The Commissioners continue, "Sir J. Lawrence informs us that he saw cholera raging at Murree in a magnificent climate, a beautiful site and fine barracks; and while admitting that men would be healthier on hills than on the plains, states that there are constitutions which do not benefit by hill-residence." And Colonel Greathead observes that, though men look better on the hills, the returns show no great difference as regards health; but he admits, at the same time, that the sanitary condition of the stations is very bad. . . The preponderance of evidence is rather in favour of heights of moderate elevation, than of those so high as Darjeeling. The Commissioners remark—"on one point, however, all agree, viz., that sickly regiments should not be sent to the hills, for such regiments invariably suffer in health. It will be remembered that it was upon the instigation and advice of this Royal Commission that the "palatial" barracks under which India may now be said to be groaning were erected.

Probably one of the most practical means at my disposal for testing the soundness of the conclusions arrived at by the Commissioners, as above given, is to quote from the narrative of H.M. 58th Regiment, as given by Dr. Ambrose, in the "Indian Medical Gazette," June 1st, 1870.

Dr. Ambrose, in this valuable report, informs us that the 58th Regiment came out direct from England to this country in 1864, at which period the regiment was almost composed of young men, of whom about one half had been recruited in English manufacturing towns, and the other in Ireland. In the following year, while quartered at Benares, with two companies at Azimghur, they were visited with much sickness, and lost nine men from cholera. At the close of 1865, after one year's service in India, the strength of the corps was diminished by 43 deaths, and 41 men invalided, or rather more than 108 per thousand. The corps, besides, was in a most enfeebled condition, as may readily be imagined from Dr. Ambrose's statement that the admissions to hospital had been no fewer than 1,945, including 786 cases of fever—of which four-fifths were malarious—202 of diarrhœa, 50 dysentery, 46 inflammation of the liver, and 56 rheumatism.

Alarmed by the reports which reached him, the Commander-in-Chief ordered a wing of the regiment to be immediately sent off to Senchal, a station five miles from Darjeeling, and at an elevation of about 8,600 feet above the sea. This order was given in spite of the dictum of the Royal Commission of 1863, that sickly regiments invariably suffer in the hills, and on no account should be sent to stations as high as Darjeeling. However, in accordance with orders, five companies of H.M. 58th Regiment, and the bandsmen started from Benares for the hills on the 1st of December, 1865, arriving at Senchal in January, the very depth of the winter. It is particularly to be noticed that these men were not picked from the regiment at Benares; the strong and weak, the sickly and the sound of one wing, in the course of a few days exchanged "the hot damp climate of Bengal for the top of a mountain which, during the month of their arrival, was, for days at a time, covered with snow lying a foot deep, or with cold, raw, dense fog, or with snow and fog together."

The experiment was certainly a hazardous one, nor is this the sort of change which one would have been disposed to recommend in the case of men suffering from the complaints enumerated by Dr. Ambrose; and, at first, the aspect of affairs was hardly encouraging. It was not until the beginning of January that the right wing of H.M. 58th Regiment, 421 strong, arrived at Senchal, by which time the sick list had risen from 23 to 41. The accommodation provided at that station was quite unsuitable to the season of the year. The barracks were composed of mud and wattle walls, roofed with sheet-iron; there was no extra issue of bedding; fires were extinguished at 9 p.m., and the thermometer in the open air at night marked 22° Fahrenheit. We can hardly, therefore, be surprised to learn that catarrhal complaints were not unfrequent during the first few months. The sick list for twelve months, however, showed the following results:—At the end of January there were in hospital 37; February, 38; March, 24; April, 23; May, 21; June, 18; July, 13; August, 14; September, 15; October, 8; November, 9; December, 7. The mortality for that period did not exceed two cases; one death proceeding from dysentery, the other from asthenia.

For two years longer this fortunate wing remained at Senchal, losing only three men out of a strength of over 400, and the average daily sick list not exceeding ten. The convalescents from the left wing that was stationed at Benares were also sent up each year to this station, and likewise the recruits annually arriving from England.

The arrangements of the barracks at Benares are described as excellent, and, owing to the absence of the right wing, there was abundant room for those who occupied them. The average strength was 318, but the daily number of sick amounted to 22, and in the three years 26 men died, and 42 were invalided, while the right wing, with an average strength of 435, lost only 5 men by death, and 29 by invaliding; among the latter the mortality was 3.8 per 1,000, among the former 27.2.

Beyond this the company at Darjeeling lost by invaliding 22.2 per 1,000 of its strength per annum, whereas, that at Benares invalided no less than 42.0 per 1,000.

Dr. F. J. Kellette has lately published some valuable "analytic charts of liver and other affections, as observed amongst the convalescents at Landour during the season of 1869." Out of 55 cases of liver disease, it appears 37 recovered, 1 was much improved, 3 improved, 14 not improved; so that under the most unfavourable circumstances it seems the climate of Landour was very beneficial to a class of cases which of all others we consider the least likely to prosper in the hills.

Statements such as these speak for themselves in language far more forcible than anything I could write on the subject; they seem to me, in fact, convincing testimony to the truth of the statements made by medical men in India, to the effect that to save the lives and keep up an effective European army in that country, one half of our troops on arrival in India should be stationed on the hills for three years, and the following three years in the plains, after which they should return home. The Suez Canal offers vast advantages in carrying out a scheme of this kind, which in fact would have been impracticable in days when it took a month or two to get news home of events passing in this country, and three or four months to bring troops out here. We may hope, however, that if the Government should agree to any such principle as above indicated, it will be better advised than heretofore on these matters; for Dr. Ambrose remarks of the barracks at Allahabad, in 1869:— "The heat during May in the new barracks was terrific—bad as the 'new standard plan' of barrack was found to be, as a protection from heat. It was, therefore, determined to give the old barracks another trial; the men themselves preferred them." A writer in the "Madras Monthly Journal of Medicine," for June, 1870, remarks on the same subject that the palatial barracks, which have tended so much to the disarrangement of Indian finance, are positive evils in regard to the preservation of the troops from epidemic disease; they have been built more to satisfy the demands of theorists than in accordance with the special requirements of the country. Every Indian sanitarian, who has considered the matter, and whose opinion is worth having, would have preferred six or eight decently built cottages to the palatial barrack which accommodates a whole company. When this subject of large and small barracks was under discussion, the Government seems to have been led by other than sanitary grounds to adopt the present plans, which were nevertheless sanctioned by Mr. R. Strachey, the

Imperial Sanitary Commissioner to the Government of India. The sanitary advisers to the Government must, therefore, bear their weight of the odium of having led the State into useless and wasteful expenditure on structures which do not make the men more healthy than they were before.

With reference to this subject, I may observe that Dr. Fayrer, in the "Indian Annals," for March, 1870, in a paper on the sanitary condition of the European Female Orphan Asylum, at Calcutta, writes:—"The history of this institution is as gratifying as it has been during previous years, and is no less remarkable for the absence of disease than for the generally vigorous state of health enjoyed by the inmates, proving that the European children, under proper hygienic conditions and careful physical training, *may* live and thrive in the plains of Bengal almost as well as in their native country. It is not merely in the absence of any serious disease, and in the low death-rate that this is manifested, but in the vigorous healthy appearance of the children generally." Dr. Fayrer, however, by no means advocates the attempt to rear Europeans in the plains of India. On this latter point my experience is quite in accordance with his; for I happen to have a large establishment of Eurasian and European children under my care, the Calcutta Martimèr; and although the girls on the foundation enjoy admirable health, they are very defective in regard to physical strength as compared with a corresponding number of girls of the same age and class in England, or in the hills. The head-master of this institution observes of the boys:—"Generally speaking, so far as I have seen, boys here attain their maximum development, mentally and morally, about the age of sixteen. After this, in most cases, they deteriorate." We find much the same rule holding good with the natives—brilliant students, but utterly wanting in originality and self-reliance as men, variable as the wind in early life; their ambition is speedily to attain a competency and rest from labour, bodily and mentally; and, as far as I can judge, the European reared in India has much the same disposition engendered in him. Englishmen can never flourish and rear their children in India; there appears no reason why there should not be a race of fair-skinned natives derived from such a stock; but experience demonstrates to us the fact that the characteristics of the Englishman are almost entirely lost under these circumstances in the second, if not in the first, generation.

The Epidemic Fever of Bengal.

For information on this subject I would refer the reader to an admirable report by Dr. Elliot, published in 1863; also to the report of the Special Fever Commission, drawn up by Drs. F. Anderson, C. Palmer, and J. Elliot, published in the "Calcutta Gazette," for June 24th, 1863; and, lastly, to the reports published in the "Calcutta Gazette," March 2nd, 1870, by Dr. David B. Smith. The following remarks are mainly drawn from the documents above noticed.

In the early part of the year 1869, some of the leading Zemindars of Bengal addressed a memorial to the Lieutenant-Governor of the province in the following terms:—

"That your memorialists are unable to furnish accurate statistics to show the total mortality caused by the epidemic during the last few years, but they have endeavoured to collect the mortuary returns of villages, and the result tends to show that, in some instances, the deaths amount to more than one-half the population, and in many others to not less than one-third. Your memorialists beg to refer your Honour to the statement appended, from which it appears that in Dwarbasini, out of a population of 2,700, 1,900 have perished during the last five or six years, and that the 800 now living scarcely contain 200 able-bodied men. In Pundooah, 5,200 have perished within the same time out of a population of 6,961, and in Echapore, the number of deaths is calculated to be about 1,050, out of a population of 1,500. These are not exceptional cases; but, as far as your memorialists may judge from appearances, might be taken as the typical condition to which scores of villages have been reduced by the epidemic during the last eight or nine years. The evil has been aggravated by the circumstance, that in all the afflicted villages a considerable portion of the surviving population suffer from protracted illness, which not unusually proves fatal in three or four years, while the number of births is so small that, for practical purposes, reproduction may be said to have ceased."

There is no reason to believe this statement is an exaggerated one, and the nature and causes of this terrible endemic, or epidemic fever, may fairly occupy our attention.

In 1863, Dr. Elliot, writing of this fever, observes that a peculiar fever like the present epidemic was prevalent in 1824—25 in the Jessore district, similar to the Purneah fever, so that the "epidemic fever," if not identical, is similar to the remittent fevers of the eastern district of Bengal. But it seems to have assumed an aggravated form in certain districts of late years, "and has slowly, but surely, extended itself into localities previously exempt."

Dr. Elliot clearly traces the fever from a village called Gudkholi, which was nearly depopulated in 1840, to Sreenugger in 1845—46, and so it gradually extended over the Hooghly and other districts in Lower Bengal. Deputy-Magistrate R. S. Sein, in the "Calcutta Gazette" for March 2nd, 1870, informs us that in many of "the infected places strangers would not enter for fear of catching the 'plague;' it is said that the village of Dhunchia escaped the general fate, and stood uninfected amidst surrounding villages, lying prostrate." The Baboo continues:—

"Various are the causes which are said to have given origin to this epidemic: want of drainage, exuberant jungle, accumulation of the filth of ages in cesspools, &c., come in for their share; nor does the railway, a novelty in this country, escape the odium of having brought the epidemic in its train. It would not be wide of the mark to admit that these causes might have contributed to accelerate the spread of the disease, and the railway might have obstructed the natural drainage of the country; but I am led to think the real cause of the epidemic still lies undiscovered. It is erroneous to decide on the basis now set forth. *Places similarly situated, as respects the river and natural drainage, fared far differently. At Kanchrapara the epidemic was violent; at Santipore it was scarcely felt. The same may be said of Beernugger and Ranaghat, which are within four miles of each other. So the real cause of the epidemic has, I think, yet to be discovered.*"

To enlarge further on the prolific sources of impurity and contamination which exist in all the affected towns and villages would be superfluous. The appearance of the villages speaks for itself to the most casual observer. The only wonder is, that people of weakly constitutions, subsisting on farinaceous diet, residing in a malarious climate, and shutting out from themselves the air and light of heaven, and drinking poisoned water, have not suffered even more extensively. But, it may be urged, all these causes of disease have been in operation for many years in many places, which have never until lately been attacked by depopulating sickness, and are now in operation in a number of places, which are still free from the scourge. Why, then, lay so much stress on these facts in accounting for the present epidemic? The objection, however, is not so strong as it appears at first sight. This fever is by no means a new or unrecognised disease. The mortality at Cossim-Bazar sixty years ago, where the same causes as those just considered were at work, was even greater than any that we have lately witnessed. In Purneah, and other districts, every now and then we hear of these deadly outbreaks of remittent fever, the country being absolutely strewn with dead and dying in the low,

ill-ventilated villages lying along half-stagnant rivers. The fact is, that in the tract of country which has been of late so severely suffering, the various causes of disease have ever existed; but within the last few years they have been gradually culminating, until in one place after another the turning point has been reached, and villages, the previous exemption of which had served to conceal the fact of their increasing liability to it, have been swept by the pestilence. It must be specially observed that the instances in which the visitation has come without warning are very few. In one village after another the story has been told of one or two years of progressively increasing illness *preceding* the year in which the epidemic has burst forth with overwhelming force.

Dr. Elliot describes the epidemic fever as essentially a "congestive remittent fever," characterised in its most deadly and most rapid forms by great general prostration, cerebral congestion, and early collapse, from which the patient, having no power to rally, is cut off in from thirty-six hours to four or five days. The premonitory symptoms appear to be not well marked, but there is little doubt that for some time previous to the actual attack the patient is indisposed, though he seldom pays much attention to this warning. The first stage is ushered in by an accession of febrile heat, preceded by only slight shivering, frequently by no sensation of coldness whatever. This heat rapidly increases, and the disease may run the quick and fatal course above described. Should the patient, however, escape this deadly and urgent attack, the fever clings to him with unabated violence for a period of from fifteen to twenty-five days from the commencement of attack. During this period he may die from exhaustion. After the fifteenth day, however, remission or intermission takes place, and the heat of skin and more urgent symptoms disappear, leaving the sufferer in a dangerous state of weakness. This freedom from febrile excitement continues for some two days, when the enemy again assaults the patient, and though this takes place generally in a less violent and deadly manner than at first, yet from previous suffering and exhaustion the enervated frame is less able than before to withstand the attack, and the result is often fatal. This second attack, as just stated, is in itself less violent than the first, and it is of far shorter duration. The fever now assumes a well-marked intermittent type; it returns usually after an interval of fourteen days, and clings with great obstinacy to its victim. Still, though the well-marked intermittent type has set in, with its three distinct stages of cold and shivering, hot, dry, febrile skin, and perspiration, yet it is not by any means unusual for the fever again to

relapse into a well-defined remittent. Again, all types of intermittent are met with from the true tertian and quartan to fevers recurring at intervals of five and fifteen days; and, as a rule, few who have been seriously attacked completely shake off the disease until change of season has fairly set in, or until they remove from the locality.

The particular seasons at which year by year the epidemic has appeared, has reached its height, and again disappeared in the various villages attacked by it, form an important subject for observation. The information received on this point has been precise and uniform. In the month of May, and even in April, after the first falls of rain, severe cases have been noticed, but they have been generally too few in number to cause much alarm. Seizures, however, have become more frequent during the next two or three months, until in August or September the disease has reached its full height. Heavy mortality has lasted until November, when it has begun to abate, and by the end of December almost complete cessation has taken place, to continue until the succeeding May. Again it must be observed, that the first season has generally been less fatal to the invaded village than the second. After periods, too, of from two to six years the disease has apparently left the infected village altogether.

Having thus briefly considered the history and symptoms of this terrible fever, we may proceed to inquire into the causes which have given rise to it; and this section may best be considered under two heads,—I. its general or predisposing circumstances; II. its immediate causes.

I. The general or predisposing influences which have been at work in the malarious districts of Lower Bengal are satisfactorily explained by Dr. David B. Smith. He writes to the Bengal Government (No. 253, May 12th, 1870) :—

"I now come to what I believe to be the most important of all the causes of so-called malarious fever, viz., *insufficient drainage, the partial or complete obliteration of rivers, and the pernicious states of soil, air, and water* which are thereby produced.

"Engineer officers who have given any attention to the subject are, I believe, all prepared at once to allow that the drainage of the Hooghly district is now very imperfect, many of the smaller rivers have silted up so much as to impede the natural outflow of water from the interior of the country. It is my impression and belief that serious obstructions to drainage are to be found chiefly in the vicinity of places which are or have been notoriously unhealthy. The complete closing, by a *bund*, of the old bed of the Damoodah river has converted the Koontee stream into a dead river. The strong embankment all down the course of the

Damoodah, on its left bank, has had the effect, intended, of preventing any flood-waters from passing into the district in an easterly direction. In consequence, to a considerable degree, of these works, the rivers throughout the district have been steadily silting up. They have also, at many parts, been further obstructed by throwing weirs or dams across them for local irrigation, fisheries, or the like, converting the old reaches of the river into a series of pools. The beds of all the water courses are thus being gradually elevated or 'honey-combed;' even rain-water is unable to flow any distance, and the usual picture, under such circumstances, is, as might be expected, extreme uncleanliness of soil where formerly broad and deep streams flowed."

Let us, however, turn from Bengal for a moment, and examine some of the reports referring to a fever which has been raging over parts of the Meerut district and the Punjab; for, it is to be observed, it is not only over the low alluvial swamps of Bengal, but also far away up in the arid plains of the north-west that we have accounts of the fearful devastation caused by this malarial fever. Probably one of the best reports ever written on this subject is from the pen of Dr. H. C. Cutcliffe, referring to the inhabitants of a line of country traversed by the Ganges canal, between the rivers Ganges and Jumna. Dr. Cutcliffe minutely describes the sanitary condition of 140 towns and villages in these districts. The physical characteristics of these places are graphically pictured. Writing of certain towns where the fever had been very severe, Dr. Cutcliffe observes:—"Along the Eastern Ganges Canal all these towns and villages are exceptionally filthy. The natural level of their sub-soil, or well-water, has been raised by percolation from the canal, and in some instances the character of the water seems to have been impaired. The drainage of all of them is very bad." Dr. Cutcliffe continues:—"May we not ask if it is probable that the collective influence, as previously described, of the Kristna and Katha streams, with the Eastern Jumma Canal between them, may have had something to do with the diminution of population in Jhanabashan? If my sketch of the debilitated, enervated and impotent state of these people is true, it must be expected as a natural consequence not only that a diminution of the population will ensue, but that a steady degeneration of stock will result." And we have only to glance over Dr. Cutcliffe's report to see how true these remarks of his are, and to what a terrible state of ill-health and premature death the inhabitants of these districts have been brought by the influence of malarious fever, consequent upon the above-mentioned causes, and referable chiefly to the influence of the Eastern Jumma Canal upon the sub-soil drainage.

Let us again turn to the report of Dr. Adam Taylor, as to the condition of the population inhabiting the districts watered by the Western Jumma Canal. Regarding this area, reported on by Dr. Dempster, in 1845, with results very similar to those of Dr. Taylor, in 1869, we find that the latter officer discovered among the inhabitants of fifty villages, distant half-a-mile from the Western Canal, that the percentage of enlarged spleens varied from 49 to 34 per cent.

This fact speaks for itself, not only as proving that nearly one-half the existing population are physically unfit for work; but it further represents a lamentable loss of life, and premature decay among these people from paludal influences; and all this is attributable, in the words of Dr. Adam Taylor, to—

"the presence of a canal, and irrigation therefrom, producing disease, exactly in the proportion in which natural conditions of locality, soil, &c., &c., prevent the land from getting rid of the excess of moisture which may be brought by that irrigation; or the converse, that is, the degree in which the canal or its water-courses impede the natural drainage of the country, and thus prevent the land from ridding itself of the water brought on its surface, whether that be artificially as by irrigation, or naturally as by rain-fall."

To overcome these evils, Dr. Taylor would *realign* the channels of the canal on approved principles, and prevent the formation of *bunds*, employing surface drainage to empty *jheels*, and sub-soil drainage to remove marsh, and fill or silt up existing hollows, old channels, &c., in which water lodges.

I would draw special attention to the facts above noticed, which amount to this. Here in Bengal we have evidence that in consequence of a silting up of our rivers and water-courses by nature, and by artificial means, the subsoil drainage of the country is interfered with, and a deadly fever is induced. In the Punjab and North-west, ill-conceived irrigation-works are constructed, so as to clog the sub-soil with water, and a vast outburst of malarial fever follows. In the one case, the State (the landlord of India) neglects to keep open the stream, and constructs works which prevent the natural outlet of water; in the second, the State constructs irrigation-works upon faulty principles to enrich its landed property, but in doing so destroys the tenantry by hundreds of thousands—I say destroys, because there is no reason why railroads and irrigation-works should not be a blessing in place of a curse to the land. What I would contend for, on sanitary grounds, is that the tenants on these canal works should be protected by law against those who

construct the works, if from neglect of hygienic principles the latter convert the country into areas engendering virulent paludal poisons. That the poorer classes should be thus preserved from secondary and remediable effects of irrigation-works seems very necessary, for these may evidently become the means of dire destruction to people living under their influence; and that in a most insidious way. The death and misery chronicled by Dempster, Cutcliffe, Taylor, and others, as a consequence of ill-arranged irrigation canals, does not, it is true, come before the public with all the horrors of a famine, but it is none the less destructive. The victims of fever and spleen suffer as severely as those who die of starvation, and their condition is even worse in some respects, for seldom is the cry of sympathy or help raised on their behalf, whereas the country is moved from one end to the other whenever the whisper of famine is heard from a district or province of India.

Dr. Adam Taylor points out the principal causes which have led to the unhealthiness of these districts from the influence of the irrigation-works, to be remedied and avoided in future works of the kind. They are:—

1. Swamps, resulting from the high level of the canal, and percolation thence resulting, must be prevented from forming; as also swamps formed by obstruction of the natural drainage of the country, resulting from defective alignment of canal.
2. Similar results ensuing from bunding of channels by zemindars, to increase their supply of water. Also from the abandonment of all canal channels or alteration of the alignment, until the former shall have been filled or silted up, and from overflowing of the canals.
3. To stop the conveyance to spots, not previously so unhealthy, of the drainage from unwholesome swamps, by channels not sufficiently capacious or complete to carry the whole past the localities in question. Also the drenching of land, after the application of manure and refuse.
4. To prevent over-irrigation creating morass, especially in jungly localities.

In fact, having relieved the soil of its super-abundant moisture, we must subsequently put in force, as far as practicable, the laws of hygiene, applicable to this and other parts of the world. Doubtless, poorness and insufficiency of diet naturally render the lower orders more liable to the attacks of the endemic fever, and increase the mortality among them; but, at the same time, people may be well fed and tolerably independent in means, and yet fall victims to the scourge. Indeed, throughout the afflicted district, the material prosperity of the labouring classes has sensibly advanced during the last ten or a dozen years. The Mahomedans, notwith-

standing their meat diet, suffered more severely than the Hindus; the percentage of deaths among the former, in fifteen villages taken at random, being 59.46, while that of the latter was 27.25. That is to say, of 16,951 Hindus *only* 4,715 perished, while among 11,460 Mahomedans the fatal cases amounted to 6,816.

The defilement of the river banks might surely be prevented by police enactments, and stringent rules should be laid down with regard to the more perfect cremation of dead bodies. At present human skulls and charred bones lie scattered about in the immediate vicinity of roads and rivers. In one field in front of a village, Dr. Smith counted 80 skulls, and dogs and jackals were prowling about among the bones in open daylight. At another place he came upon 30 or 40 new Mohamedan graves close to the roadside; and we know how shallow these usually are. During the prevalence of the disease (Epidemic Fever of Bengal) dead bodies were simply flung into the jungle to feed the wild beasts and birds of prey, and on several occasions Dr. Smith witnessed the sickening spectacle of dogs and jackals tearing human remains.

II. The second point which I have to notice is "the immediate cause" of malarial fever. It seems to me an unquestionable fact that in localities similarly circumstanced to those I have described—in which the soil is surcharged with moisture, especially if vegetation is abundant—it gives rise to a something which will induce the symptoms of malarial fever among the majority of persons exposed to its influence. But what this something is we know not; we speak of it in a glib and confident style as *malaria*, but we really know nothing about it, except that it produces a certain train of phenomena in the human body. Nevertheless, in reading over the history of the disease we cannot but be struck by the fact of the remarkable exemption of some villages from its influences, as mentioned by Baboo R. S. Sein, and other observers, localities which, to all appearance, are under precisely the same circumstances as other villages, the inhabitants of which have been laid low with fever. And then, again, the fever is known on several occasions to have left a place for a time, and returned to it without any appreciable change in the conditions of the locality at the two periods. All this, to my mind, points to the fact of the poison which engenders the form of fever now under consideration, being probably something which is localised in a certain spot for a certain time, it may be in a tangible form. The question is, How are we to advance our knowledge in this direction? It appears to me we are hardly likely to "fix" malaria in the air or soil, but I

think it very probable we might find it in water. I doubt not the influence which excites paludal poisoning exists in the air, and very likely in the soil, and the history of the gradual spread of this disease in Bengal and other parts of the country points to a tangible and definite something as emanating from the soil, and probably finding its way into water. Take, for instance, the case of the Napaul Tarri; I formerly used every year to form one of a shooting party into these jungles, but our water was sent to us every day from the plains, for so surely as the waters of these localities were partaken of, clear and beautiful as they looked to the eye, so certainly the person drinking them got fever or dysentery. I have often seen cases in point. On the other hand, Mr. Bethington, in the "Indian Annals" for 1865, p. 526, gives us convincing testimony to the fact that, even in malarious districts, restricting the drinking water to that from good and well-protected wells will preserve the people from ague. These, together with the case of the ship *Argo*, and other instances of the kind, lead one to hope that the matter which induces malarial fever might be discovered in the water of affected localities. We want a series of experiments instituted— Firstly, to determine if water of this kind will induce ague among persons residing in unaffected localities: my experience leads me to suppose it will. Secondly, the microchemistry of such water; if it contains organic matter, at what stage of oxidation it is dangerous; in fact, what is the natural history of its contents, and will its dry residue poison other waters. Thirdly, the history of this organic matter, if any, when swallowed, how it acts on the human body, and why it sets up a train of symptoms known as ague.

Researches of this kind can only be worked out by men residing in localities under the influence of malaria; they offer, therefore, a wide field for study to observers scattered over various parts of the world, and might be taken up by men specially appointed for the work by governments, such as those of England, France, Germany, and America. Men appointed to investigate the matter should, by common accord, be set definite questions, to the solution of which they should strictly confine their attention, and the result might be an advance towards the solution of a problem very momentous to the human race, viz., the immediate cause of malarial poisoning, which will most certainly never be solved by guess work.

Asiatic Cholera.

The number of works lately published in India on the subject of cholera has been very considerable, the disease having extended over the whole of this Presidency during the year 1869. I feel it is almost beyond my power to give an intelligible account of the labours of Indian authorities within the compass of this report, but I think I may best accomplish the work I have taken in hand by selecting one or two special instances of the disease, and noticing the bearing of facts and the opinions of medical men in various parts of the country, as elucidating the features of the cases cited. We may, probably, in this way arrive at a just estimate of the tendency of scientific opinion at the present time in India on the subject. For details I would refer the reader to Surgeon-Major J. F. C. Ross's admirable "Sketch of the Medical History of the Native Army of Bengal for 1869," to the reports of Dr. Cowie, of Burmah, Dr. De Renzie, of the Punjab, and Dr. Townsend, of the Central Provinces. Dr. Murray's and Dr. Bryden's works, published by the Government of India in 1869, are familiar to those who take an interest in these matters, so also are the various papers bearing on the subject in the "Indian Medical Gazette."

The instances of the disease I propose giving are—1st, those of H.M. 58th Regiment, from the report of Dr. Ambrose, quoted so freely in the first section of this Paper. 2nd, the particulars of the outbreak of the disease at Murdan, as related by Dr. J. R. Johnson, of the Corps of Guides (p. 185 of Surgeon-Major Ross's "Sketch of the Medical History of the Native Army of Bengal, 1869.")

In March, 1869, H.M. 58th Regiment were quartered at Allahabad, and as the new cantonments were not completed, the Clydesdale and Mansfield barracks had to be occupied, seven companies in the former, one company, and the married people in the latter, two companies occupied barracks in the fort. In February cases of cholera were reported among the natives living in the city of Allahabad, their number gradually increasing; the disease being most prevalent among people living along the banks of the Jumna River. The city is almost half a mile to the south of Clydesdale barracks. The cantonment bazaar to the north of, and very close to, Clydesdale, was reported to have furnished one death by cholera on each of the following days:—3rd and 6th February, and 12th March.

It appears from a "Report of the Committee appointed to enquire

into the Sanitary Condition of Allahabad, 1869," that at the time we are now writing the latrines attached to the barracks were objectionably situated, the number of conservancy carts was not sufficient, and the admixture of dry earth with the impure matter had not always been effected; consequently, the iron receptacles and carts were sometimes met on the road in such a terrible state as to be a very abominable nuisance. Then, again, the impurities in no way deodorized, had been buried always in too large quantities together, in land much too near cantonments." In Dr. F. Macnamara's report on the analysis of the potable waters of Allahabad, for February and March, 1869, he observes: "Mansfield-line well, used by European infantry in Mansfield-line Barracks, their sole source of supply for drinking purposes; this well is in a hollow surrounded by trees, sixty yards from the barracks." Dr. May reports: "I have never seen a well used by Europeans so dirtily kept as this one; waste water, which lay about the well, was charged with decomposing vegetable matter," and, at the time of Dr. May's visit, "smelt intolerably." The water in the well was alkaline, it contained ammonia, nitrous acid, and phosphoric acid, and required ·00048 grains of oxygen for oxidation of readily oxidisable organic matter, in 1,000 grs.

Such being some of the surroundings of the 58th Regiment in the early part of 1869, "after a long spell of dry weather, a thunder-storm and heavy shower of rain occurred on the 21st March," nearly an inch of rain falling, quite sufficient to wash the organic matter on the surface-soil and in its dry sandy substratum into the wells, tanks, and rivers. On the following day two cases of cholera occurred among the men of the regiment; by the end of the month they had 24 cases and 13 deaths, and before the end of the following August, the 58th Regiment had no less than 104 cases, and 73 deaths from cholera. Dr. Ambrose reports on the subject:—

"A perusal of the narrative of the experience of this regiment will, I think, satisfy any one that the disease, if not stopped at once, receives a certain check, and disappears in a short time, after the party attacked has been got far enough away from the centre of infection. As I have already gone sufficiently into detail to enable the reader to form an opinion for himself on this head, I will confine myself to summarise the principal practical points deducible from the extended experience of the 58th in 'moving out' during the last year.

"In all, thirteen different moves out of Allahabad were accomplished.

"Ten of the moves were for distances *exceeding* three miles. In six of these ten instances the parties sent out were at once freed of

cholera. The four remaining moves gave results as follow: In one (six miles, followed up by a short move of a mile farther on), the disease lasted for twelve days after going out, ten seizures and six deaths having taken place before cholera finally disappeared. One move (of four miles) was followed by one case only, and that case I consider to have been a sporadic one, on the seventh day after going. Another move (fifty miles) was followed by three cases, all fatal, within three days of leaving Allahabad. Lastly, the party which went to Burgurh, on the 9th, had two fatal cases on the following day. As I have before remarked, it is extremely probable that the men attacked subsequent to the two latter moves had their systems powerfully impregnated before the parties to which they belonged left Allahabad. If I am correct in this assumption, the fact is an interesting one, as showing the length of time cholera is capable of remaining dormant in the system.

"The three moves for distances *under* three miles were all unsuccessful. When the distance was increased to six or more miles from Allahabad, the disease was, in two instances, at once shaken off, and in the third, got rid of the day following that on which the second move was made.

"The river Ganges was crossed four times, on every occasion with complete success; unless the party which went to Jhoosia, and had one sporadic case on the seventh day after crossing the river, be looked upon as an exception. The Jumna was crossed by three different parties in railway trains. One party remained free after crossing; the second had no more than two cases (fatal) on the day after crossing; the third escaped after losing three men in three days from the date on which it crossed the Jumna. Thus large rivers were crossed on seven different occasions by as many parties, the total number of individuals composing which amounted to about 1,180; of these only six were attacked with cholera when once they had got over the river; and it is a remarkable fact that of the six so attacked all proved rapidly fatal.

"Ten of the thirteen parties, after having shaken off the disease, returned to Allahabad before the station was free from cholera, and were, sooner or later, invariably reattacked. The three detachments which came in from camp at the end of September, when Allahabad was pronounced free from cholera, were not reattacked."

We may now proceed to the history of cholera in Murdan, as given in one of the most carefully compiled and interesting reports I have read on the subject. I cannot do better than transcribe verbatim Dr. J. R. Johnson's account of this outbreak of cholera. He writes:—

"*Relative positions of Murdan and Peshawur, and brief description of the country.*—On reference to a map it will be seen that the Swat and Kabul rivers intersect the valley at a point equidistant between Peshawur and Murdan, and about sixteen miles from each place. The country intervening between the rivers and Peshawur is highly irrigated, and densely studded with populous towns and

villages. The group of towns, named Hushtnugur, is situated on the left bank of the Swat river, and from this point to Murdan (sixteen miles) the country is one vast open plain of uninhabited table-land. This plain is unirrigated, and boasts only of two insignificant hamlets which are situated about its centre. The most cursory glance at a map will show, far better than I can describe, the densely populated character of the country between Peshawur and the Kabul river, and also the vast plain that intervenes between the latter and Murdan.

"A few cases of malignant cholera appeared in Peshawur during the last week in August; seizures rapidly multiplied, and the disease became epidemic in the city on the 5th or 6th, and in the military cantonments on the 11th of September. The first case in the civil subdistrict of Murdan occurred in Hushtnugur on the 11th of September, and a few days later the epidemic spread to all the villages on the left bank of the Kabul and Swat rivers. On the 30th September, a party of seven mat-makers came down from the hills, passed through Hushtnugur, where the disease was then raging, and arrived the same evening at Murdan. During the night one of their number was seized with cholera; he was taken to the Civil Dispensary, where I saw him early the following morning (1st October), and at once had him removed to a detached building for treatment. This man died early on the morning of the 3rd. Two of the dispensary patients were attacked on the afternoon of the 4th, and both died the same night. Up to this time the military cantonments and village of Murdan, the town of Hoti, and, in fact, all the country at our side of the Hushtnugur table-land were perfectly free from even suspicious seizures. Knowing cholera to be in our neighbourhood, and receiving daily reports of its prevalence and extreme fatality in Hushtnugur, I was naturally on the alert; I visited almost daily the large villages in our neighbourhood, and both by enquiry and personal observation endeavoured to ascertain the first trace of its existence. I am, therefore, in a position to assert, with some confidence, that the three cases noted on the 1st and 4th of October were actually the first and only cases that occurred up to those dates. There were no further seizures until the 8th, when one individual died in Murdan. The first case occurred in Hoti on the 9th, and from the 11th to nearly the end of the month the disease was epidemic in both places. The last reported seizures in Murdan and Hoti occurred respectively on the 22nd and 27th of October. Hoti was the last village in Tusufzaie where the disease established a footing; it neither reached the hills, Swat, or Bonair, nor did it leave the district by any other route.

"Official intimation of the existence of epidemic cholera at Peshawur reached the officer commanding Murdan on the 11th September, when measures were instantly adopted with a view of preventing individuals from the infected locality visiting the station. All soldiers, camp-followers, and others, returning from the Peshawur direction, were kept in a quarantine camp for four days, at the expiration of which they were examined by the medical officer, and, if well, were allowed to rejoin. All strangers and

others, previously unconnected with the station, were, on any terms, strictly prohibited from visiting or taking up their abode in cantonments. This last measure emanated from the officer in temporary command of the regiment, and was, in my opinion, a wise and sound measure; overcrowding was thus obviated, and fugitives from stricken districts were forced to abandon their intention of converting the station into a city of refuge. As quarantine regulations could not apply to the neighbouring civil community, it was necessary to exclude them also from cantonments.

"The measures above generally delineated were strictly enforced until the 11th of October, when, in consequence of the appearance of cholera at Hoti and Murdan, it was further ordered that all soldiers and residents of the station, whose homes were situated in these and other adjacent villages, should for the time being take up their abode with their respective families; residents of the station were also strictly confined to cantonments. These various precautions were enforced until the end of October, when, owing to the disappearance of cholera, there was no further necessity for their existence.

"Notwithstanding the extreme prevalence and fatality of cholera in two large villages, distant little more than half-a-mile from the fort, only one case occurred in cantonments during the continuance of the epidemic. The case referred to was that of a camp-follower, who was attacked in the cavalry lines on the 18th of October, and died after a few hours' suffering. Quarantine and its various restrictions were completely abolished on the 1st of November. Cholera had then ceased to exist at this side of the Kabul river, but information of isolated cases at the other side of the river, and in Peshawur, continued occasionally to reach us.

"On the night of the 28th of November a cavalry native officer of Guides, whose home was in Peshawur, returned from a few days' visit to that city; he had slight diarrhœa on the road, and was profusely purged during the night. Early the following morning when the circumstance was first reported, I visited his quarters, and found him labouring under cholera, which proved fatal on the night of the 30th. On the same night (30th November) an infantry native officer was, under precisely similar circumstances, seized with choleraic diarrhœa, but the case was brought to notice earlier, and he eventually recovered. These were the last cases in the regiment or district. The foregoing facts show very clearly that the recent epidemic starting from Peshawur, traversed sixteen miles of populous country, crossed two rivers, and established itself on the left bank of the Swat river in five or six days, while its journey over the same extent of open uninhabited country, intervening between the river and Murdan, occupied thirty days.

"If atmospheric influences were the only or even chief agents exerted in disseminating the disease, it is, to say the least, remarkable that they should have propagated it over sixteen miles of populous country and two rivers in six days, and yet have taken thirty days to convey it over a similar extent of uninhabited country possessing no rivers, and lying in identically the same line.

"Many instances of the supposed propagation of cholera by

human intercourse were brought to my notice by natives of the district during the recent invasion, but such cases being unauthenticated are not worthy of notice. The facts observed by myself, viz., the rapid spread of the disease through a district studded with villages, its halt amongst human habitations, and subsequent slow progress over an open plain, together with the three unequivocal instances narrated of its introduction by individuals from infected localities, have led me to the conclusion, that it was carried about and propagated from place to place almost exclusively by human beings."

Dr. Moore, of Rajpootana, writes in his report for 1869—"I have been thus particular, and perhaps lengthy, in noting the facts of the cholera at Aboo, 3,000 feet above the level of the plains, because, with the exception of a few mild cases in 1866, this is the first time epidemic cholera has ever occurred in the locality, and of course exaggerated reports were prevalent regarding the epidemic. Also, because the importation of the disease from Anadra to Omedgunge, and from those places up the hill, is so clearly traced. The ascent to Aboo faces the west, and the village of Shaulgaum is to the east. If, therefore, cholera were always 'air-conveyed' from Dr. Bryden's epidemic localities, the latter village should have been first attacked, and the cholera should have proceeded down the hill to Omedgunge and Anadra; whereas the exact reverse was the case. It is also worthy of remark that, owing to the grass famine during 1869, the hill people were in the habit of conveying loads of grass for sale to the plains; whereas in former years there was no traffic of this kind; the coolies coming up the hill and mostly returning the same day. And this may to some extent account for the former absence of cholera on the hill. I believe, had it been practicable to stop all communication with below, no cholera would have occurred on Aboo. But this was not possible; and all that could be done was stationing persons on the road to prevent any sick being brought up."

Cholera broke out at Kohat in November. Dr. J. Ross informs us that "Deputy-Inspector General G. Morton animadverts very strongly also here, and so indeed do all the medical officers, on the nature of the water supply, and he remarks that it is a fact worthy of note that no cases of cholera occurred in the fort, garrisoned by one company of artillery and infantry, which is close to the source of the water supply, but which possessed a good well inside its walls. Dr. Morton's remarks on the nature of the water supply at Peshawur and Kohat, in reference to the fatal nature of the epidemic, are worthy of notice; in fact, since 1867, Dr. Morton has been drawing attention to the subject in all his reports."

We may now refer to one or two cases of the disease which have lately occurred at Calcutta.

In the "Indian Medical Gazette" of the 1st June, 1870, Dr. Waller reports the history of an outbreak of cholera on board the P. and O. steamers at Garden Reach, and in the following number we have an account of the disease on board the *Edith Moore*.

Cholera was very prevalent among the native population around the premises of the P. and O. Company in February and March, 1870. The *Simla*, one of the company's steamers, had her tanks filled with water on Saturday the 5th, and Monday the 7th March, 1870. During this time, and up to Friday 11th, water for cooking purposes was supplied by bheestees, who procured it from an unclean tank near the ship. On the 10th of March three patients suffering from cholera were admitted into hospital from the *Simla;* four cases on the 11th, two cases on the 14th, one case on the 15th, and two on the 18th. Twelve cases in all. The *Deccan* lying at the other end of the P. and O. premises, was supplied with water she had taken in at Galle. She had two cases of cholera on board, the one an officer who had taken a meal on the *Simla*, and who had subsequently attended on a brother officer affected with cholera. The second case was that of a man who had been wandering about in the neighbouring bazaar.

The immunity, however, of the other P. and O. steamers at this time also in their moorings close to the *Simla*, is very remarkable, no cases occurred in the *Surat*, *Mooltan*, or *Hindostan*, but none of them were allowed to use any water taken from the shore.

The case of the *Edith Moore* is also well worth recording. This vessel took in 3,500 gallons of water from the Widow and Orphans Filtering Company at Calcutta, on the 30th May, 1870. She cleared at the Shipping Office, with a clean bill of health, on the 31st May, in view to dropping down the river early on the following morning.

It appears, from the concurrent testimony of the men sent up from the *Edith Moore* at Saugor, on the 4th of June, to be admitted into the Presidency General Hospital, that a water tank and two casks on the deck—not filled on the 30th May—were replenished about midnight on the 31st, from a boat alongside; and that this water was used for immediate consumption by the crew.

The *Edith Moore* dropped down from the Esplanade moorings in the early morning of the 1st June, and, according to the statement of the agents, she left the port of Calcutta at about 11.30 a.m.

At breakfast, on 1st June, there was a general feeling of dissatisfaction about the water served out, from the pilot to the distressed seamen on board. The steward, Hughes, and the seamen, Larsen, Crawford, and Peter Setma, declared that the water was muddy, highly brackish, and offensive to the smell, and that it contained pieces of organic matter in a state of putrefactive decomposition. They further state that the water was taken from the supply obtained about midnight on the 31st, a few hours before the vessel was under weigh.

The period when this water was taken on board was the time of all others when the river Hooghly opposite Calcutta is liable to be mixed with cholera dejecta. After 10 p.m. the work of consigning

the sewage of the city into the river at Chitpore, and that of the suburbs into the river below the residence of the ex-king of Oude, begins. When, therefore, high tide is opposite Calcutta about midnight, as on the 31st, the water, during the cholera season, is liable to be impregnated with the cholera stuff of both the city and suburbs.

It is not possible to conceive that the water described could have been subjected to filtration. If endeavours had been made to filter it, all that can be stated, according to the testimony of the men aforesaid, is, that the filter employed must have been utterly useless. This water was, in all human probability, the Hooghly water, taken in when the tide was rising, and when it is always, at midnight, polluted—off Calcutta—with the sewage of the town; and was to all intents and purposes practically unfiltered and unpurified. Under these circumstances the following cases of cholera occurred on the *Edith Moore*:—

"(A) John Becker, aged 45, a distressed seaman, was attacked with cholera at 5 a.m., on the 2nd of June. He was admitted into the General Hospital in a state of collapse, and quite moribund, at 10 p.m. on the 4th idem. He died five minutes after admission, or at 10.5 p.m. It appears that he had been under treatment for some time in the Howrah Hospital for scurvy and epilepsy. The steward, Hughes, and the sailor, Crawford, are positive that when Becker came on board on the 31st, beyond being an invalid and an epileptic, he presented no other indication of illness; that he did not betray a single symptom of cholera prior to the hour and date of attack, as given above, and that he, like the rest of the crew who were seized with cholera, was stricken down after the use of the unwholesome water taken on board, about midnight, on the 31st May.

"(B) Hans Peterson was taken ill with cholera about 9 p.m. on the 2nd June, and expired during collapse, about 10 a.m. on the 4th idem, on board the *Edith Moore*.

"(C) Andre Jacobson, aged 26, was seized with cholera at 10 a.m. on the 2nd June, admitted into the General Hospital at 10 p.m. on the 4th idem, in profound collapse, from which he never rallied. He died at 8.30 p.m. on the 5th.

"(D) Forquarn Larsen, aged 27, was attacked with cholera at 8 p.m. on the 3rd June, admitted into the General Hospital at 10 p.m. on the 4th idem, in a state of collapse, from which he has rallied. He is now rapidly convalescing.

"(E) William Crawford, aged 37, was seized with cholera at 7 a.m. on the 4th, and admitted into the General Hospital at 10 p.m. of the same day. On admission he was in a state of collapse, but he soon rallied.

"(F) Peter Setma, aged 22, was attacked with vomiting and purging, attended with severe cramps of the diaphragm and abdominal muscles, at 7 a.m. on the 4th. This man never passed into collapse. His case was one of cholerine, or true cholera cut short. He was admitted into the General Hospital at 10 p.m. on the 4th June.

"(G) Robert Hughes, the steward, was taken ill with violent

cramps in the stomach at 5.30 a.m. on the 1st June. He ascribed the illness to the water. This was not a case of cholera. But the attack followed a consumption of a draught of the bad water almost as promptly as the symptoms of arsenical poisoning supervene upon a poisonous dose of arsenic; had he remained on board, and continued to drink the same water, he would most likely have suffered from genuine Asiatic cholera. He, however, declined to leave the port, and requested to be taken to the General Hospital, into which he was admitted at 10 a.m. on the 1st June. He is doing well."

Dr. Cowie, in his most instructive report on the sanitary condition of Burmah for 1869, at page 89, observes:—

"I give here an instance of the manner in which cholera is conveyed by means of drinking water. The American ship *Congress* entered the port of Akyab on the 13th February, the crew all well. The captain on learning that cholera was raging in the town forbad his men going on shore. He had a small supply of water on board, and he said that the crew should use it up first before he would take any from the town. He also determined that when obliged to replenish his tanks the new water first of all should be used in the cabin. This resolution was adhered to, and his chief and second officers were seized with cholera and died. He and the stewardess were also attacked, but recovered. This water was now thrown overboard, and fresh supplies were obtained from a tank situated in the civil lines and near the entrance to the harbour."

There were no more cases of cholera on board.

The last point I would notice in the history of cholera for 1869, is the circumstance of its apparent rapid decrease in the town of Calcutta after an unprecedented fall of rain, which occurred here on the 9th June, nearly eleven inches of rain falling over the city within the twenty-four hours.

During the year 1869 there were as many as 3,592 deaths reported in Calcutta from cholera. They occurred as follows:

	No. of Deaths.
January	264
February	428
March	762
April	746
May	698
June, up to the 8th (on the 9th, eleven inches of rain fell)	264
June, from the 8th to the 30th	203
July	78
August	53
September	41
October	57
November	78
December	58

But it may be argued, cholera always ceases with the setting-in of the rain in June; is this really the case? For instance, in 1868, I find that from the 1st of January until the 9th of June there were 1,968 deaths from cholera in Calcutta, and from the latter date until the end of the year there were 1,905 deaths reported from the disease, showing by contrast, in a marked manner, the effect of the downpour of rain in 1869 in stopping the mortality of cholera for the remainder of that year.

Pathology.—Dr. Fawcus, of the General Hospital, Calcutta, has lately communicated the details of post mortems made on the bodies of those who have died of cholera. He insists on the fact of the great importance of examining the body immediately after death; many of his post mortems have been made within *five minutes* of the patient's decease. Under these circumstances he finds the condition of the parts very different from what they would have been had the post mortem examination been delayed for an hour or two. The most interesting of these observations are contained in the following quotation from Dr. Fawcus's remarks, published in the Inspector General of Jails' (Bengal) Report for 1869. He writes:

"*State of the Heart.*—In all *post mortem* examinations made immediately after death, whether the patient died in collapse or in reaction, the cavities on both sides have been found flaccid and moderately full of blood. No remarkable distention of the right side has been found. There is no reason, therefore, based on *post mortem* appearances, for concluding that there has been obstruction in the lungs. Shortly after death the left ventricle contracts, for it is always found contracted if the examination be deferred. The right ventricle, in cases dying in collapse, and examined several hours after death, is found distended with dark clots; and in cases dying in reaction, examined after the same lapse of time, it is not distended, but contains a firm light-coloured clot. It seems as if in the former case the weak ventricle had been prevented from contracting by the presence of the dark, thick, clotted blood, and in the latter, as if not meeting with the same obstruction, it had contracted on the light-coloured clot, and pushed the fluid serum and corpuscles into the pulmonary artery, and even into the lung.

"*State of the Lungs.*—The lungs, both in collapse and reaction, are as light as healthy lungs, and contain very little blood if examined immediately after death, but their weight increases gradually after death, and more rapidly and to a greater extent in reaction than in collapse, probably because in reaction the serum from the clot in the heart penetrates the lung with greater facility than the dark, thick blood of collapse. Often in reaction the lungs are diseased, and in these cases heavy; but, as in some cases of undoubted and long-lasting reaction, the lungs are light and perfectly free from disease, it is right to conclude that lung disease is not an essential element of reaction. I could

never detect with the microscope any abnormal condition of the bronchial epithelium."

These observations of Dr. Fawcus are being rigidly tested by other observers in this country, and they tend to demonstrate the fact I have strongly insisted on in my work on Asiatic Cholera, that the theory promulgated by Dr. Johnson is faulty, not only because he is unable to substantiate his position regarding cholera by sound evidence, but, on the other hand, the accumulating work of observers, both in India and other parts of the world, is yearly demonstrating the fact that the basis upon which he builds his theory is imperfect; for we have no evidence in the bodies of those just dead from cholera that the right side of the heart contains more blood than the left, or that there has been any obstruction to the flow of blood through the lungs on account of spasm or contraction of the smaller arteries. Dr. Fawcus also confirms my observations as to the state of the epithelium of the lungs. Immediately after death these cells are not in the diseased condition described by Dr. Thudicum; subsequently they contain molecular matter, but not unless the patient has been in deep collapse for a considerable time, or the *post mortem* delayed for some time after death.

Etiology.—In the early part of 1869 two medical officers, Drs. Cunningham and Lewis, arrived in Calcutta; they had just completed their course of study at Netley, and were deputed by the Home Government to test the correctness of certain views, old as the history of cholera in Europe, regarding its dependence on fungi. The ideas of Pettinkoffer, a man whose fame is known to the world of science, were committed to take their trial before our new judges, and, in fact, the etiology of cholera, and the important results flowing from it were apparently to be left to their safe keeping. Now, while fully appreciating the talent of these young men, their judgment and indefatigable energy, which all those residing in the field of their labours will readily admit, still many of us believed we started in life with advantages equal to those of most men, and have worked with good eyes and instruments, good energy and success in our professional career, and, after ten or fifteen years' diligent search, had pronounced an unqualified disbelief in the fungoid theory of cholera. We are hardly surprised, therefore, to find our younger brethren have arrived at similar conclusions. We are too well accustomed, however, after years spent in India, to be astonished at the turn matters have taken; we are accustomed to witness opinions taken up, discussed, and dropped, to be revived in another form, and, perhaps, accepted within a few

years, or it may be the reverse; for, as has been observed, we too often start on the principle of endeavouring to prove that three and three make six, and, having demonstrated the fact, have to go over all the work shortly afterwards, in order to solve the same problem in another form, to show, perhaps, that three and three make half-a-dozen. And so with cholera; it had been asserted in the most unmistakable language, as the result of long and careful study in India, that cholera does not depend upon fungi—three and three make six! "Well and good," exclaim the authorities. But does not the disease depend on Hallier's cholera cysts?—"demonstrate, if you please, that three and three make half-a-dozen." Unfortunately, this system influences practice; for instance, in 1861, Mr. Strachey, then a Sanitary Commissioner, now a member of the Governor-General's Council, and exercising paramount influence over all these matters, believed he had shown that cholera was a something that spreads in a "*round about*" manner; he endeavours to explain his meaning by coloured plates, maps, and so on, in his report on the Punjab cholera of 1861. At page 191 he writes, cholera being epidemic at Bhurtpoor: "It commenced, as we have shown, at the end of April, and became prevalent in the month of May. From this centre the disease appears to have become generally diffused. During the months of May and June, the circle was extended with *a radius* of about 120 miles. Speaking generally, we believe that cholera advanced in the manner which we describe." And now, after the experience gained by the world-wide epidemic of 1866, and all the knowledge since accumulated on the subject, we find the Government of India reiterating these very same principles. In June, 1870, orders were issued regarding cholera camps by the Commander-in-Chief and the Governor-General in Council, in which it is stated, page 19: A regiment being attacked by cholera "may proceed thence by the rail, in hopes of getting clear of *the radius* within which the epidemic may have pronounced itself." (The italics are mine, showing the words used in 1861 were repeated in 1870.) Again in page 7 of this order, dated as late as June of the present year, we learn that "communication with the locality should, as far as possible, be prevented; for frequent communication with places where the disease is prevalent will always be likely to cause alarm, and produce bad results;" and so on.

I would point to the instances I have given at the commencement of this paper in refutation of views such as those above expressed. The cases I have noticed are a few among volumes of similar instances reported from time to time to the Government of India, and surely they point to results incompatible with this "round-

about" theory of cholera. If we take these facts in the inverse order to that in which they are related, we find cholera unmistakably influenced by the rainfall; an exceptionally heavy fall of rain in 1869 almost extinguished the disease for the remainder of the year in Calcutta. We have in the case of the *Congress*, the *Edith Moore*, and the *Simla*, evidence of the fact that water which has run every risk of contamination from the dejecta of cholera, has produced cholera among those partaking of it, the vessels being away from land were far removed from emanation from the soil, the outburst of cholera in each case occurring among the crew directly after the consumption of the impure water. We have proof that the removal of a regiment (the 58th) from an infected locality, in which, at any rate, one of the sources of potable water was in a filthy state, instantly and invariably stopped the progress of the disease among the men of the regiment; but it returned again directly the men revisited these infected places. It is worthy of remark that during the outburst of this epidemic and throughout the hot season the water in the "deep well at the railway station of Allahabad" stood at an average level of no less than sixty-five feet from the surface of the soil. And so again at Meerut, during the month of September, 1869, 83 cases of cholera occurred in cantonments, and the difference between the water-level from the beginning and end of the month, was an increase of five inches. At Bangalore during the same month there were 281 cases of cholera, with a rise of four inches in the subsoil water. Lastly, passing right away to the extreme north-west of the British possessions in India, we have not only cholera appearing at Peshawur, supplied with open canals containing filthy drinking water, but we have a singularly succinct account of the circumstances under which the disease spread from this infected place over a densely populated country, and its inability to extend over a desert, and into a station protected by a well enforced system of quarantine. This is by no means the only instance to be found in Dr. Ross's report of the native army for 1869, in which a strict quarantine prevented the ingress of cholera into a military station or similar locality.

Whatever may be the immediate cause of cholera, it seems to me there can be no doubt the disease is spread by man, and is prevented when both the human subject affected with cholera, and drinking-water (rivers) polluted with cholera matter, are kept out of a district, town, or village; and that in whatever other way the disease may be conveyed from man to man, it is evident it is induced after drinking water exposed to contamination from the dejecta of those affected with cholera.

Preventive Treatment.—It follows from the above considerations that we may best preserve those committed to our care from this terrible disease—at any rate troops and such like bodies of men—by measures such as the following, contained in a letter I recently addressed to Dr. Murray, the head of the Indian Medical Department, on the subject. Dr. Murray, as is well known, has since 1856 been strenuously urging those in authority as to the necessity of removing troops affected with cholera into camp; through good report and bad report he has consistently advocated this system, and fought for the fact, and its consequences, of the contagiousness of cholera. He would hardly, however, endorse my ideas as to the frequent communicability of the disease through drinking contaminated water; nevertheless, he forwarded my communication, as follows, to the Military Department of the Government of India (June, 1870):—

"I believe one of the first and chief elements in the protection of men from cholera is to prevent their water-supply from being polluted by the organic matter passed from those suffering from the disease. Supposing they partake of polluted water of this kind, a certain proportion, depending on the condition of their general health, and the virulence of the infecting matter, will be attacked with cholera, in from six hours to four days after having swallowed the water. Consequently the men of a regiment having been exposed to influences such as I have above indicated, may, after partaking of the polluted water, remove from cantonment, and still cases of cholera occur among them for three or four days, although they may be absolutely free from further contamination; nevertheless, under these circumstances, the men attacked by the disease may be centres, so to speak, from which it is diffused. On the other hand, if a regiment be smitten by cholera and the men at once removed from fresh contamination, and those already under its influence eliminated from their comrades, it is more than probable the remainder of the regiment will remain free from the disease. It is in this sense I maintain it to be possible to stay the progress of cholera among a body of men over whom we have absolute control.

"The question is, how are these principles to be enforced?

"The rules and regulations regarding cholera camps have been fully elaborated, and I will not now dwell on the subject. But I would remark that whether cholera has appeared among the civil population of a district or town, or commences among the men of a regiment, directly cases have occurred in the corps it should immediately be marched some six miles from cantonments, if possible, encamping on the banks of a river, but above all things it is necessary that on this camping ground a good well exists, removed from trees, and drains, its sides should be lined with the best masonry work and raised above the soil some two feet, its mouth must be bricked over; a well-constructed pump being the only possible means by which water can be drawn from the well, the pump should

be locked, and never used except by order of the authorities. Cook-rooms, as simple as possible in construction, but such as Europeans could cook in without danger of exposure to the sun, should be constructed on the encamping ground, and kept in good order so as to be ready at a minute's notice. The day, or even a few hours, prior to the regiment moving from the station, a dozen Europeans should be sent a-head to pump a quantity of water out of the well, so that a supply of fresh water will have drained into it before the men arrive on the encamping ground.

"No Bheesty should on any account be allowed near the spot; the water from the pump must be carried about in iron vessels, it must not be put into a museck; all our hopes of stopping the progress of cholera depend on the water of the well being preserved untainted.

"The regiment having arrived on the ground, officers and men must dismiss as far as practicable their native servants-bearers, Kidmaghars, &c.; at the outside, one servant being allowed to each officer. The British soldier's stomach is, I am aware, a thing not to be trifled with, but if practicable he should under these circumstances be made to cook, not only for himself, but also for his officers—native cooks if possible being excluded from camp, together with the other servants; in fact, the regiment must be surrounded by guards preventing the approach of natives to the camp—the corps placing itself in absolute and strict quarantine—the latrines being of course some little way out of camp.

"The camp being on the banks of a river, the men should as soon as possible after leaving the station bathe in the river, one and all of them, and they will have to wash their own clothes; the more speedily they can manage to wash one suit of clothes after leaving cantonments the better; we know not how often cholera is spread by means of dhobies washing our linen in the water of contaminated tanks.

"In addition to the above, I would advise every man in the regiment being made to swallow a draught every night of the following mixture:—Rum ʒi; Acid. Sulph. dil. ɱxx; Syrup. Simplex ʒss; Aqua ℥ij.

"But as cholera may remain dormant in the systems of men for say four days after leaving cantonments, it is very possible cases will occur on the second and third days after quitting barracks, in which case the regiment must move on to another camp supplied with a well, pump, and cook-rooms, such as I have described; the sick must be left behind, and dealt with according to rules specially devised for the purpose.

"In this way every station should be provided with four cholera camping grounds for each European regiment, and provided the plan above recommended is strictly carried out, both as regards officers and men, no cases of cholera can occur after they have reached the fourth camp, unless from fresh contamination, and this will hardly happen if these rules, simple as they are, can be enforced. But unless carried out in their entirety, they will certainly fail. It would be considered foolish to throw out a rope to drowning men, a part of which was rotten; and so with the

system I advocate, if attempted, it must be put in force with a will —there must be no fault, no rotten link in the chain, or it cannot possibly succeed; new barracks upon approved principles and all that human forethought can suggest have been tried to prevent cholera spreading in a regiment; as for instance among the men of H. M. 58th last year, but it failed, and will, I am convinced, be a failure to the end of the chapter, unless we can protect our men from the influences of the organic matter which induces cholera. Fortunately this organic matter, if left to itself, soon becomes oxydized and destroyed, so that we have only to leave it to nature — preventing a fresh supply, which can come alone from the human bodies of those affected with cholera—and the poison works its own destruction.

"Should it fortunately happen that the means indicated do protect our troops from cholera in camp, they will be the surest guides as to the proper means to be taken to preserve them from cholera when in barracks; and surely while searching for the immediate cause of this disease, in earth, air, and water, it were wise to put to a crucial test, such as I propose, the most advanced knowledge we possess on the subject."

Instructions such as these by no means countenance the notion that we have simply to supply a town with pure water, and thus prevent the ingress of cholera into the place. In Europe we should be careful the pure water is not subsequently contaminated by exposure to foul air. If every floor or room inhabited by the poorer classes in our large towns, were supplied with a tap, from which they could draw pure water as they required it for consumption or other purposes, and provided this water was alone used, epidemic cholera would never gain head in such a locality; cases might and would occur in a town under these circumstances, if the stagnant air of its over-crowded courts were contaminated by organic matter, arising from the dejecta of those affected by cholera or cholerine; but even under conditions of the most absolute neglect as regards sanitary matters, we should, unless by aid of contaminated water, hardly witness those deadly outbursts of cholera which are so characteristic of this terrible disease.

Some two years since, the Government of India selected five of their most able and energetic medical officers, men in the prime of life, and having served some ten or fifteen years in India, to be sanitary commissioner of the five divisions into which the Bengal Presidency is divided. Of these officers, Dr. Cowie, in an admirable report upon the sanitary condition of Burmah, during the year 1869, observes, p. 89, "I have strong reasons for believing that the disease (cholera) was largely propagated by drinking-water. That it can also spread by the atmosphere I do not mean to dispute, but my observations show me that the disease never travels as fast as the

wind. It would appear to move from place to place as rapidly as rivers flow, or as a man travels, no faster. The soiled clothes of cholera patients again will spread the disease. A native of India dies of cholera, and his friends invariably appropriate the deceased's clothes. They are not buried with the body, nor are they burnt."

Dr. DeRenzy, Sanitary Commissioner for the Punjab, writes, p. 15, "the localisation of the disease being unaccountable on the air-theory of propagation;" p. 11, "in the course of my tour, I observed facts which strongly confirm Dr. Snow's doctrine, that cholera spreads with most virulence where the facilities for its communication through water were greatest;" p. 37, "the supply of pure water in every house will remove the most fertile cause of disease, more especially of epidemic cholera."

Dr. Townsend, Sanitary Commissioner of the Central Provinces, in his report, page 291, observes: "If it is the case (and there can be little doubt that it is so) that cholera is diffused chiefly, if not solely, by means of human intercourse, it must be obvious that the establishment of an effective quarantine would be a measure of the greatest utility." The Madras Cholera Commission of 1868, with Dr. W. Mackenzie, C.B., as President, remark at page 23: "All the evidence in our possession, whether derived from the Cholera Congress, or from our own inquiries, seem to point so distinctly to the contagiousness of the disease, that the most practical use to which we can apply this knowledge, is to investigate the origination and progress of the disease under the different circumstances wherein it has been observed, as affecting masses of the community." Further, of five hundred medical officers in this country, who answered Dr. Murray's questions as to the communicability of cholera, no fewer than 456 distinctly and clearly state that the disease was communicable. Nevertheless, in spite of all this testimony on the subject, it is asserted in the July number of the "British and Foreign Medico-Chirurgical Review," page 117, that "experience in India is certainly on the whole opposed to the doctrine that human intercourse is the only, or even principal, cause of the spread of the disease (cholera) over any large area of country." It is very remarkable that a journal, holding the high position of the "British and Foreign Medico-Chirurgical Review," should have been led into making a statement of this kind, in face of evidence such as that above quoted, a statement so likely to mislead those who are not rightly informed as to the prevailing feeling among the medical profession in India on this subject.

I assert most distinctly, however, my conviction, that medical men in this country are clearing themselves from the time-honoured

ideas founded upon electrical, epidemiological, morbific waves of cholera, and the like fancies; doubtless it may be good for us, in our onward march after sounder knowledge, to be held back by influences, such as those exercised by the War Office Sanitary Commissioners and their advisers in England; but most certainly the views of these gentlemen do not represent the opinions of the medical profession in this country, at the present time, as regards cholera.

With reference to the lately developed ideas as to "morbific cholera waves" passing over the world, I would refer the reader to the May and June numbers of the "Madras Monthly Journal of Medicine," where evidence is given which seems to me to demonstrate the danger of drawing conclusions, on a subject like this, from statistics compiled from returns supplied by our military and jail authorities, independently of those of the civil population by whom they are surrounded.

The length of this report prevents my entering upon a review of other interesting matter connected with the progress of medicine in this part of India; but I may observe that Dr. Harvey, of Rajpootana, has paid great attention to the subject of revaccination. He mentions, among other instances, that, during an epidemic, the 37th Regiment, men, women, and children, were revaccinated; they had only one case of small-pox, and that occurred before the operations were completed. In the 102nd, at Lucknow, three cases of small-pox appeared in February, and on the appearance the regiment was revaccinated. Six cases afterwards occurred, all of them in persons who had managed to evade revaccination. No revaccinated individual was attacked.

It is far from a difficult matter to persuade our richer classes to undergo revaccination; but amongst our poorer classes at home, and the natives in this country, it is a different matter, and it becomes a subject of considerable interest whether some system of adult vaccination should not be enforced by law, in addition to the already existing vaccination act.

SUPPLEMENT.

Mr. Macnamara having omitted from his Report for India a sufficient notice of his own elaborate and suggestive Treatise on Cholera, which forms so conspicuous a feature in the Indian medical literature of the year, I have felt it my duty to add, as a supplement to the Report, the following notice, kindly prepared by Dr. Sansom. (Ed.)

"A Treatise on Asiatic Cholera, by C. Macnamara." *Illustrated by maps, tables, &c.*

In the Preface the author says: "I have not aimed at originality, but simply to record the work I have done, and the opinions I have formed during fifteen years' consecutive labour in the endemic area of cholera."

Mr. Macnamara considers cholera to be a disease generated at all seasons of the year among those inhabiting India, and capable of being disseminated over the world through the instrumentality of the *fomes* of persons who have suffered from it, either in its severe form, or in the milder form described as cholerine. It has a predilection for constitutions impaired by defective hygienic arrangements, pre-existing disease, or any cause of depressed nerve-force.

The seizure is characterised by nausea, faintness, and a feeling of oppression in the præcordial region, griping pains in the abdomen, frequent watery purging (the stools being alkaline when passed, and in appearance resembling rice-water), constant vomiting, suppression of urine, and profuse perspiration. The skin is inelastic, and that of the hands and feet shrivelled and dusky; the eyes are sunk, and the features pinched; cramps are felt in the limbs; there is difficulty of breathing, intense thirst, excessive restlessness, rapid small pulse, and suppressed voice. The external temperature of the body sinks below 88° F., and a peculiar sweetish sickly odour (fishy) is exhaled from the body, breath, and dejections.

If left to nature, about one-half of those attacked with cholera recover of themselves, reaction supervening, and often being accompanied with fever, and not unfrequently with suppression of urine and various other complications; or the disease may terminate, within a few hours of its commencement, in fatal collapse.

The author gives a comprehensive sketch of the history of cholera. First, in India, from the earliest records to the early part of the present century. It was nothing new for the disease to spread over India in earlier times, but in 1817 and 1819 its nature was for the first time fully recognized; and the country having passed under British rule, there were more facilities of tracing its progress.

The facts connected with the extension of cholera at various times to other parts of the world, abundantly attest its contagious character. Concerning its geographical distribution, no region was exempt from it except arid wastes; "a desert appears to be the only country in which cholera is unable to establish itself under

existing circumstances." The meteorologic conditions favouring it are high temperatures and moist atmospheres. In India it is epidemic after downpours of rain followed by intensely hot weather.

The characteristic features of the disease are the following :—

1. Unequal distribution: the localised outbursts point to a cause more definite than mere atmospheric "influences."

2. Preference for certain localities. With the exception of seaports its greatest virulence is in low levels.

3. It by no means, even in the majority of instances, attacks inhabitants of the most insalubrious localities of towns.

4. It is never generated afresh out of its endemic area. The more searching the inquiry into the history of first cases of cholera occurring in countries previously exempt, the more certain has been the proof of contagion from pre-existing cases.

5. Its outbreaks have well-marked periods of increase, culmination, and decline.

6. After subsidence it disappears altogether, except in its endemic area.

7. Its propagation is exclusively from Hindustan, through a continuous chain of human beings affected with it, or through articles stained with their dejecta.

8. In the majority of cases, the medium of its diffusion is drinking-water.*

* At page 196 the following striking example of the effect of water contamination is given: "In connection with this subject I may mention the circumstances of a case which occurred in another part of the country, but in which the most positive evidence exists as to the fact of fresh cholera dejecta having found their way into a vessel of drinking-water, the mixture being exposed to the heat of the sun during the day. Early the following morning a small quantity of this water was swallowed by nineteen persons (when partaken of, the liquid attracted no attention, either by its appearance, taste, or smell). They all remained perfectly well during the day, ate, drank, went to bed, and slept as usual. One of them, on waking next morning, was seized with cholera; the remainder of the party passed through the second day perfectly well, but two more of them were attacked with cholera the next morning. All the others continued in good health till sunrise on the third day, when two more cases of cholera occurred. This was the last of the disease; the other fourteen men escaped absolutely free from diarrhœa, cholera, or the slightest malaise.

"In this case it was certain that the contaminated water was once, and once only, partaken of. Its effects were, that out of a party of nineteen healthy men who swallowed it, five were attacked with cholera within 72 hours, the remaining fourteen individuals were absolutely unaffected by the poison. These details leave us no reason to doubt that water, contaminated with cholera, produced the disease in five out of nineteen people who swallowed it, and that, independently of either the season, nature of the soil, or any appreciable circumstances, all of which were remarkably in favour of the persons attacked by the disease. Nor was

All the reports of the 1865-66 epidemic tend to support the theory of the late Dr. Snow, and to refute the view expressed by the London College of Physicians in 1854.

The author says: "So surely as water, contaminated with cholera dejecta, is capable of reproducing the disease, when consumed during the vibrionic stage of decomposition, so certainly it may be drunk with impunity after this stage is over, and when ciliated infusoria have replaced the vibrios. The vibrios are not the efficient agents, but only indications of a certain stage of decomposition at which the organic matter is poisonous, or capable of transmitting its action to the epithelium of the intestinal canal." The evidence of *post mortem* examination shows that the characteristic feature of cholera is that the changes in the epithelium to be described, occur during the life of the patient; they are evidence, in fact, of the rapid destruction of these cells taking place before death. Microscopic examination of the epithelial cells covering the villi of the small intestines or those lining Lieberkühn's follicles, shows them to be invaded by molecular particles, resembling those seen in a pus-corpuscle. In the course of a few hours the molecules may be observed to have increased and multiplied within the epithelium cells, and finally there results an irregular mass of molecular matter, which constitutes the bulk of the rice-water evacuations. Under higher powers ($\frac{1}{25}$th and $\frac{1}{70}$th Powell and Lealand) this molecular matter still appears as a collection of minute specks or particles often possessed of an independent though limited motion. No difference can be observed between this series of changes and that common to all healthy epithelium-cells when undergoing decomposition; it is the rapid destruction *during life* which is the characteristic feature of cholera. Disintegration of epithelium is also observed in the secreting structures of many of the glandular organs of the body as well as in the lungs, but this is probably a *post mortem* change.

Concerning the theory of "fungoid origin" the author says, that having never, after diligent search, found any fungus peculiar to cholera, he has abandoned his faith in the existence of any such growth. The theory and the treatment adopted by Dr. George Johnson are severely criticised. The author concludes that cholera is essentially a destructive of intestinal epithelium, due to the

cholera prevalent in the place; I am assured it had not visited the locality for several years, nor has it, as far as I am aware, appeared there since."

(It would be interesting to know, under the circumstances stated, how the cholera dejecta came into the water drunk by these persons. Had a cholera patient been in their midst?—Ed.)

influence of a specific organic matter. This *specific fomes* is invariably a portion of the fomes of a person suffering from the disease, and must, to produce its effects, be in the vibrionic stage of decomposition. The fomes may be preserved in the dry state for years, but always undergoes decomposition in water; the vibrionic (infecting) stage of decomposition lasts from two to five days in water *slightly* contaminated with it, and exposed to a high temperature. As to *treatment*, the premonitory diarrhœa is always to be checked, and opium seems to be the best agent for this purpose; afterwards sulphuric acid, with attention to all collateral symptoms. The castor-oil treatment is worthless. The prevention of the disease by hygienic measures is loudly called for, and vigorous well-directed efforts are expected from the Indian executive government.

PORTUGAL.

Report by G. H. BRANDT, M.D., *Knight of the Tower and Sword, Commander of the Order of Christ, etc. (of Oporto).**

AMONG the most indefatigable workers in medicine in this country is Dr. Pedro Franscisco de Costa Alvarenga. Professor of Medicine at the School of Lisbon, Physician to the St. Joseph and Misericordia Hospitals, and editor of the "Gazeta Medica de Lisboa." This distinguished physician is the author of several interesting works, chiefly on diseases of the heart; he was the first to introduce the sphygmograph into Portugal, which has completed his researches and given much importance to his observations. One of the most interesting subjects he has treated of is on Displacements of the Heart, to which he has given the name of "Ectocardia," instead of "Ectopia," which was used formerly, but which did not explain the kind of displacement, nor the organ displaced.

* EXTRACT FROM LETTER ACCOMPANYING REPORT.

"You must not be surprised if the Report for 1870 is not so lengthy and interesting as it might be. Though a small country, Portugal possesses men of great intellect among the graduates of the Coimbra University, as also from the Medico-Chirurgical Schools of Lisbon and Porto, who, if they devoted time and talent to the different branches of the profession, would have raised the standing of medicine to a level with larger countries; this they might easily accomplish, with the large field of observation they possess in the numerous public and private hospitals spread over the whole country. The chief evil has been politics, which has absorbed a considerable number of their first talents, and deprived science of some of its greatest ornaments. One might be led to suppose that this would have had a salutary effect on the scientific institutions of their country; but such has not been really the case, for, with few exceptions, they have been entirely lost to science and its institutions, and it is very doubtful if, under the present *régime*, they would not have served their country better had they adhered to their noble profession.

"I purpose in this Report to pass in review some of the principal original works on medicine published in 1869 and 1870; also the works of the Medical Society of Lisbon; Therapeutics; Vaccination, Jennerian and animal, with a few remarks on an epidemic of small pox in Lisbon; an account of the new hospital for the insane; and the meteorological observations for 1870 if they are completed in time."

Among the different kinds of ectocardia, he describes one which is not mentioned in any of the classical works, and which constitutes a novelty in pathology; to this nondescript displacement he has given the name of Trochocardia, or more correctly Trochorizocardia, from τροχεῖν, to turn; ἐρίζον, horizontally; καρδία, heart.

The following table will show his classification of displacements:—

- Ectocardia
  - Intrathoracic
    - Lateral
      - Dexiocardia.
      - Aristocardia.
      - Trochocardia.
    - Central
      - Mezocardia.
      - Epicardia.
      - Hypocardia.
  - Extrathoracic or Cardiocele
    - Thoracic.
    - Abdominal.
    - Cervical.

The heart, though displaced, may remain inside the chest-cavity; it may also be found outside; this constitutes his first division into Ectocardia Intrathoracic and Extrathoracic. According to the particular direction which the displacement takes, the Ectocardia is lateral, central, or vertical; when directed to the right, he calls it Dexiocardia; to the left, Aristocardia; these may be complete or incomplete. The transversal or horizontal deviation of the heart receives the name of Horizocardia; the author considers this form of deviation a variety between Dexiocardia and Aristocardia. Finally, in the genus Lateral Ectocardia, Professor Alvarenga places a species of displacement as yet not described, in which the heart, besides its horizontal inclination, undergoes a rotary movement on its own axis. This constitutes a double deviation; firstly, as regards the general direction of the organ, and, secondly in the change of relation of its parts. It is to this species, of which the author has observed and reported a remarkable example, that he has given the name of Trochocardia.

The superior and inferior displacements bear the names of *Epicardia* and *Hypocardia;* the displacement on the mesial line bears the title of Mezocardia.

The Extrathoracic Ectocardias, or Cardioceles, are divided into Thoracic, Abdominal, and Cervical, as in Breschet's classification.

The work is divided into four parts:—

1st. A methodic classification of all the displacements of the heart—Ectocardias divided into species.

2ndly. Historical and critical part.

3rdly. On Ectocardias in general; their importance, diagnosis, etiology, and treatment.

4thly. The particular description of each kind, followed by a new species, not before described.

The author has added a large number of observations collected by him in the St. Joseph's Hospital; most of these observations are accompanied by sphygmographic tracings, which have enabled him to follow up the progress of the displacement. He has also given the result of several post-mortem examinations. Dr. Alvarenga has ascertained, by means of the tracings, that the pulse in Ectocardia is not altered in its principal characters, neither in the onward progress of the displacement, nor in the return of the heart to its normal position. He has also noted that the kind of pulse proper to certain affections of the heart and large vessels is not modified by the fact of the displacement.

Considerations and Observations on the Epoch of Occlusion of the Foramen Ovale (*Trau de Botal*), *and of the Canalis Arteriosus.* By the same Author.

In this work, Dr. Alvarenga, owing to the great divergence of opinion expressed by different authors, such as Galen, Carcanus, Riolan, Senac, Almagro, Flourens, Longet, and Beclard, as to the time of occlusion of the foramen ovale and canalis arteriosus, has undertaken a series of observations in order to verify the facts, and thus add further light to this debated question. The author, assisted by Senhor J. J. da Silva Amado, Preparator and Curator of the Museum at the Medical Chirurgical School of Lisbon, has tabulated a large number of observations on the hearts of children who have died at St. Joseph's and the Foundling Hospitals; to render these observations more valuable, they have followed certain rules laid down by them previous to examination—viz., number of observations, date, age, sex, total weight of each child, weight of heart, weight of each lung, of each kidney, liver, spleen, encephalon, and separately of brain and cerebellum, and, finally, the state of persistence, or occlusion of the foramen ovale and canalis arteriosus. Several well got up tables show the result of these observations; we give the last table (page 126), in which will be found the *resumé* of all the observations.

Age.	Foramen Ovale.			Canalis Arteriosus.		
	Number of Cases.	Open.	Occluded	Number of Cases.	Open.	Occluded
First 24 hours . . .	30	30	—	16	16	—
From 3 to 5 days .	7	7	—	2	2	—
„ 5 to 8 „ . .	6	6	—	1	1	—
„ 8 to 11 „ . .	9	9	—	5	5	—
„ 11 to 14 „ . .	10	10	—	6	6	—
„ 14 to 17 „ . .	7	7	—	7	7	—
„ 17 to 20 „ . .	9	9	—	8	8	—
„ 20 to 23 „ . .	4	4	—	3	3	—
„ 23 to 26 „ . .	4	4	—	4	4	—
„ 26 to 29 „ . .	2	2	—	2	2	—
„ 29 to 30 „ . .	24	24	—	19	18	1
„ 30 to 45 „ . .	28	28	—	17	17	—
„ 45 to 60 „ . .	12	12	—	8	7	1
„ 2 to 2½ months	8	7	1	6	5	1
„ 2½ to 3 „	15	14	1	8	4	4
„ 3 to 3½ „	6	6	—	5	3	2
„ 3½ to 4 „	5	5	—	4	3	1
At 9 months and ½ .	3	3	—	1	—	1
From 12 to 19 months	8	5	3	3	—	3
At 2 years	3	2	1	2	2	—
„ 4 „	1	1	—	1	—	1
„ 4½ „	1	1	—	1	1	—
„ 12 „	1	1	—	1	—	1
Total . . .	203	197	6	130	114	16

From this table we infer—

1st. That from the time of birth up to the age of 29 days, the persistence of the canalis arteriosus has always accompanied that of the foramen ovale.

2ndly. That at every period the obliteration of the canalis arteriosus accompanied that of the foramen ovale, with the exception of two cases (which occurred one in a child 2 years old, and another in a child 4½ years), in which the canal was still open, whilst the foramen ovale was already occluded. This exception took place in the proportion of 2 : 130, or 1·53 per cent.

3rdly. That the occlusion of the canalis arteriosus was observed at an anterior date to that of the occlusion of the foramen ovale—the first occurred on the 30th, and the second on the 45th day after birth.

4thly. That with the exception of the two cases mentioned, the occlusion of the canalis arteriosus was more frequent in each of the periods of extra-uterine life than the occlusion of the foramen ovale.

The following table clearly demonstrates this conclusion :—

Ages.	Foramen Ovale.	Canalis Arteriosus.
	Frequency of Occlusion per cent.	Frequency of Occlusion per cent.
From 2 to 2½ months . .	14·28	20·00
„ 2½ to 3 „ . .	7·14	50·00
„ 3 to 3½ „ . .	—	40·00
„ 3½ to 4 „ . .	—	25·00
„ 9½ „ . .	—	100·00
„ 12 to 19 „ . .	37·50	100·00
„ 2 years	33·33	0·00
„ 4 „	—	100·00
„ 4½ „	—	0·00
„ 12 „	—	100·00

We cannot omit mentioning a third very important work by the same author, which has facilitated medical statistics, and done away with much confusion which existed in that department. The title is "Noticia sobre a Estatistica dos Hospitaes de Saõ Jozé—Saõ Lazaro, e Desterro."

In order to obtain a true and trustworthy statistic, the author had to do away with the old cards placed at the head of each bed, and substitute them by a series of clinical bulletins for medicine, surgery, venereal diseases, and obstetrics. We only give a copy of the bulletin for medicine, the others only differing from this by their special indications relative to surgery, venereal diseases, and obstetrics. The bulletins for the female wards only differ from the first regarding questions in relation to menstruation.

Each bulletin is divided into four columns :—

1st Column.

Clinical Bulletin.

Hospital . . . . . Medicine . . . .
Year 187 . . . Ward . . . . Bed No. . . . .
Register No. . . . . fol. . . . . Number of Order . . . .

Name and filiation of Patient . . . .
Age . . . . Civil State . . . .
Professions . . . . Duration and epoch of exercise . . . .
Place where he exercised his profession when taken ill . . . .

Nationality: Locality . . . . ; Parish . . . . ; Commune . . . . ; District . . . .

Habitation: Street No. and Flat . . . . ; Parish . . . . ; Commune . . . . ; District . . . .

Hour and date of day when disease began . . . .
Do. do. of entrance to Hospital . . . .
Do. do. of discharge . . . .
Duration of disease outside the Hospital . . . .
Do. do. in the Hospital . . . .

Has he had Small Pox, and when ? . . . .
Has he had Measles, and when ? . . . .
Has he had Scarlatina, and when ? . . . .
Is he Ruptured (seat and number) ? . . . .
Has he had other Diseases, what kind, and when ? . . . .
Has he been Vaccinated—when ? . . . .
Has he been Re-vaccinated—when ? . . . .
Can he read ? . . . .

Signature of Physician who admitted Patient . . . .

2nd Column.

Diagnosis: Name of Disease . . . . ; Seat . . . . ; Period or degree . . . . ; Form (acute or chronic) . . . . ; Variety . . . .

Concomitant Diseases: Pre-existent . . . . ; . . . . ; Intercurrent . . . .

Temperament . . . .
Constitution . . . .
Height . . . .
Habit—predominant, and any other circumstances which may be convenient to mention . . . .

Causes of Disease . . . .
State of Patient on Discharge . . . .
Was a Post-mortem made . . . .
Treatment out of Hospital . . . .
Treatment in Hospital . . . .

Physician . . . .

3RD COLUMN.
Journal.

Dates.	Symptoms and Progress of Disease.	Autopsy.

4TH COLUMN.
Journal.

Dates.	Prescriptions.	Diet.

With this basis to work on, Dr. Alvarenga proceeds to establish his "Statistical Tables." These are made by meteorological seasons —he prefers the meteorological year to the civil year, as it represents more correctly the influence of general causes, the meteorological conditions relative to the different seasons on the production and progress of disease, as also on the treatment. Every one admits the influence of meteorological conditions on the regular exercise of functions, on the pathogeny and therapeutics of disease. These conditions had been noticed and handed down to us by the venerable Father of Medicine. The action of light, heat, atmospheric pressure, wind, humidity, electricity, and even of ozone, on our organism is generally admitted.

The author's statistics being divided into seasons, he begins by Winter, which comprises December, January, February; 2ndly, Spring—March, April, May; 3rdly, Summer—June, July, August; 4thly, Autumn—September, October, November.

The statistic of each season is divided into four sections, like the clinical bulletins. The statistic is made by wards, so that each disease is considered in its different phases, with each of the wards of the three hospitals. This seems very important, as it enables a comparison to be made between the duration, termination, and other circumstances, either between cases of the same disease in different wards, or of different diseases in the same ward; also for study and research on local influences. A description of the wards in the three hospitals is also given with regard to the flat, aspect, capacity, number of windows, number of beds, cubic space for each patient, and the relation per cent. between the number of beds and windows.

The statistical tables are arranged in such a way, that by a simple inspection the following conclusions are easily arrived at:—

1stly. The absolute and relative frequency of diseases.

2ndly. Which are the wards where a given disease has been treated, and its frequency in the wards.

3rdly. The frequency of each disease relative to sex, age, civil state, temperaments, constitutions, professions, nationality, vaccination, residence, or domicile.

4thly. The absolute and relative frequency of sexes, age, state, temperament, constitution, nationality, vaccination, and results or termination of disease.

5thly. The frequency of diseases in the different systems, organs, or parts affected.

6thly. The absolute and relative duration of disease, out of and in the hospital.

7thly. The mean duration of disease out and in hospital.

8thly. The general mortality of disease.

9thly. The mortality considered, particularly in relation to sexes, ages, states, temperaments, constitutions, professions, nationality, vaccination, and duration of disease.

The work ends by an account of treatment and post-mortem examinations, and is accompanied by the meteorological observations for the year taken at the Royal Observatory of Don Luiz.

The statistic comprises three hospitals, St. Joseph, with 19 wards, and 831 beds; St. Lazaro, 3 wards, and 142 beds; Desterro, 3 wards, and 216 beds. The indications of age are divided into periods,—up to 6 years, 6 to 12, 12 to 25, 25 to 35, 35 to 45, 45 to 60, 60 to 70, and above 70.

The professions occupy three groups:—

1st. Mechanical occupations, prostitution, and sedentary life.

2nd. Occupations exposed to vitiated air by crowding, dampness, changes of temperature, animal substances, vegetable and mineral, also by chemical decomposition.

3rd. Field labourers, military men, seamen, beggars, and undetermined professions.

As regards locality, mention is made of margins of sea, rivers, valleys, mountains, etc.

During the year there were 332 accouchments, 322 lived and 10 died of metro-peritonitis; mortality, 3.01 per cent. As regards seasons, we find in winter 70 accouchments and 2 cases of death, in spring 98 and 1 death, in summer 73 and 6 deaths, in autumn 83 and 1 death. Of the 336 children born 162 were males and

139 females. Of the males 15 died, and of the females 16, besides 2 of undetermined sex.

The greatest mortality was in summer, 11.26 per cent.; in winter, 10.25 per cent.; in spring, 9.80; autumn, 6.17. The general mortality was 9.33 per cent.

Public Hygiene.

"*Salus Populi Suprema Lex.*"

Such is the title of a well-written article by Dr. Mautinho, of Porto, in which he advocates the necessity and practical possibility of stamping out syphilis. After describing the social evil, and pointing out the horrible effects of syphilis on the present and future members of society, he considers the voluntary transmission of the disease a crime greater than theft, perjury, or any other personal injury, inasmuch as it not only affects the man, but is spread to the innocent wife and child from generation to generation. As such it should be considered as punishable as any other criminal act.

The voluntary transmission of syphilis once considered as a criminal act, it becomes a necessary consequence to punish the offender. To arrive at this practical part of the question, the author wishes a tribunal to be instituted, composed of a judge and three medical men, who would have to decide on the nature of the cases, and impose the penalty.

The penalty once sanctioned by law, the great majority of individuals would no doubt abstain from transmitting the disease. This would naturally contribute largely to the decrease of disease. Those who, in spite of conscience and law, became refractory to both would become liable to punishment.

No criminal could complain, unless it were against his own wickedness. No witnesses would be required, as the disease stamps its own mark on every individual. The author urges the great importance of this subject, *the extinction of syphilis*, as a means of ensuring to present and future society vigour, peace, and general happiness.

Therapeutics.

Pancreatic Emulsion of Fat.—After two years' trial with this substance in numerous cases of phthisis, and other diseases where impaired nutrition is a prominent symptom, I have come to the conclusion that it by far surpasses any other oily preparation. The great advantage it possesses over the other fat producers is that it not only is easily digested without causing any fatigue to

the stomach, but when taken immediately after meals in wine and water (I find Malmsey dissolves it better than any other wine) it helps the digestion of the food just taken; its action in producing increase of weight is much more rapid than by cod liver oil whether taken internally or by inunction.

Pancreatine, dissolved in wine, has proved an excellent digester, and is of much value in certain forms of dyspepsia so prevalent in this country.

Sulphur in dyspepsia has been a very successful remedy in the hands of Senhor Barboza of Lisbon, and has found many followers in Portugal and the Islands Azores and Madeira. It is used by insufflation, and internally mixed with water.

Bromide of Potassium in tetanus and epilepsy.—Very remarkable and numerous cures have been recorded in the "Journal de Sciencias Medicas de Lisboa" for 1869-70. Several very interesting observations on the effects of bromide of potassium in tetanus, with very favourable results have on several occasions been noticed by May Figueira, Curry, Cabral, and Motta. Senhor Martius claims for Portuguese medicine the first idea of treating tetanus by this salt.

Camphor, as a dressing in the treatment of surgical wounds, is much in vogue at the University Hospital of Coimbra; the success obtained quite justifies its employment.

Petroleum oil in the treatment of itch appears to act more rapidly and efficaciously in destroying the acarus than any other insecticide; it is mixed with olive oil in various proportions according to the delicacy of the skin. This is followed some time after by an alkaline warm bath, and constitutes an easy and certain cure.

Carbolic Acid incorporated with lard as an external application in psoriasis and eczema, with arsenic internally, has produced very remarkable results.

Phenic Acid.—Considering this acid to have a specific and destructive action on microscopic ferments, and on the supposition that intermittent fever is caused by the introduction into the system of cellular Zoosporoides, of the species Palmellæ Cryptogamiæ, Senhor Motta has tried it in ague (a very prevalent disease in some parts of this country), both in solution internally and by subcutaneous injection, sometimes separately, at others both together.

In eight cases experimented on, five were quotidian ague, two quartan, and one tertian.

The dose in the first case was from 8 to 18 drops in the twenty-four hours, given at the termination of each access, and continued

during the period of apyrexia. The hypodermic injections were in doses of 20 to 30 milligrammes for 1 gramme of distilled water; no complication, in the shape of eschars or abscesses, etc., occurred. The patients complained only of slight pain, which never lasted more than half-an-hour. In almost all of the cases, thermoscopic observations were taken during and between the attacks. The thermic curves agreed with the observations of Baersprung, Wunderlich, See, and others. The conditions of the spleen, of the urine, and other observations will be published at a future period.

The results were six cured—four of quotidian ague, one of quartan, and one of tertian; there was no definite result in the other two cases. Senhor Motta intends pursuing his experiments when the ague season begins, and observes that it will be a great boon to the poor inhabitants of the ague districts if this treatment should succeed, one of the chief reasons being the high price of sulphate of quinine.

Treatment of diseases as practised by Dr. May Figueira, Physician in Ordinary to the Queen, and Professor of Clinical Medicine at the Royal Hospital of St. Joseph, at Lisbon.

Among the many improvements which Dr. May Figueira has introduced into Portugal, we must first mention the hygienic measures adopted by him in his wards. Ample space for each patient, thorough ventilation, cleanliness of floors, walls, furniture, bedding, and clothes, etc. are all attended to most carefully. The food is remarkably good and abundant. Water and baths plentiful. Annexed to his wards is a department for microscopical and chemical observations, first introduced by this physician for the benefit of his pupils and for the advancement of science. The whole of this department is quite equal to, and even surpasses, many foreign institutions.

Lisbon is also indebted to him for a new mortuary building; until then the bodies of those who died in the hospital remained in the beds for some considerable time, and from there were taken to their graves. By this new arrangement the bodies, immediately after death, are taken to this dead-house, placed on a bed in a cell, of which there are two rows, one on each side of a corridor, which runs lengthwise, each cell is separated by a wooden partition. A guard is always in attendance. As soon as the body is deposited in the cell, metallic rings are placed on the fingers and toes; each ring is attached to a metallic wire, which communicates with an electric bell; the least movement causes the bell to ring like an alarum, and the guard is at once in attendance with

everything necessary that may be required for recalling life into action.

I have selected a few cases as illustrations of Dr. May Figueira's therapeutics as followed at this hospital.

Pleurisy.—In this disorder, the author, after numerous observations, has come to the conclusion that the fear which exists among many physicians of performing the operation of thoracentesis has been more prejudicial to humanity than if they had punctured every case of pleuritic effusion indiscriminately. As yet he has not had one fatal case, and has come to the conclusion that in every case in which an exact diagnosis has shown considerable effusion, and particularly if there is displacement of the heart, he punctures the chest, even in cases where no previous treatment had been undergone. Should, however, the effusion be small, he begins by an appropriate internal treatment, and with blisters for about a fortnight. In case this treatment should not have procured the desired effect, he then performs the operation. For this purpose he uses "Blanchet's" capillary trocar, which has the advantage of letting out any serous liquid slowly, and without cough or lipothemia, and also of causing no serious injury in case of an error of diagnosis. When the liquid is purulent he withdraws the capillary canula, and replaces it by one of a larger calibre. In these cases (empyema) he injects dilute phenic acid through the drainage elastic tube, which he introduces immediately after the withdrawal of the canula.

In *Bright's Disease*, which abounds in this large hospital, and which is so obstinate under treatment, Dr. May Figueira has found great benefit from the use of pure nitric acid mixed with water (as lemonade). He has found it superior to tannin, borax, tincture of cantharides, perchloride of iron, etc. He gradually increases the dose to twenty-four and thirty drops four times a-day. Milk and raw onions he has found most useful in diminishing anasarca and albuminuria.

In *Pneumonia*, and in cases of phthisis with much fever, symptomatic of inflamed lung-tissue, he uses the white oxide of antimony, considering it without a rival, infinitely better than tartar emetic, digitalis, or veratrine. He regulates the dose according to the heat of skin and frequency of pulse, and has given as much as 6 to 12 grammes in a dose, occasionally associating it with brandy. He is much against opium in diseases of the lung and pleura, considering its use as retarding resolution, and interfering with the effects of more appropriate remedies.

Tænia.—After many and repeated trials to dislodge this parasite, Dr. May Figueira has found that the most efficient remedy is the resinous part of the bark of the wild pomegranate root. The bark ought to be gathered in October. He has introduced two formulæ, the first of which is published in the Formulary of the St. Joseph Hospital:—

℞. Bark of wild pomegranate root . 60 grammes
Alcohol at 22° . . . . 500 grammes

Macerate for twenty-four hours, and boil until reduced to 300 grammes. The second formula is not yet published, but by his kind permission I am allowed to do so now.

℞. Bark of wild pomegranate root . 60 grammes
Alcohol at 22° . . . . 500 grammes

Macerate in 100 grammes of the alcohol for twenty-four hours, then add the remainder of the alcohol, and boil the maceration until it is reduced to 300 grammes. The alcohol may be substituted by white wine. It is very important that the bark be gathered at the proper season. This quantity is given on an empty stomach in five portions, with intervals of half-an-hour each, and then followed by a dose of castor oil. The author has had cases in which, although the medicine had been rejected, still the worm had been expelled. The seed of the pumpkin, in doses of 60 to 90 grammes, has also given very good results, but it is not such a certain remedy as the former.

Tetanus and Epilepsy.—Several severe cases of this disease have been cured by the use of bromide of potassium in large doses. The first attempt in this country at treating tetanus by this agent was made by Senhor Curry Cabral, one of Dr. May Figueira's pupils and in his wards. The same medicine has been tested in epilepsy, and in several instances with favourable results. This physician has now in one of his wards a woman who has been suffering from epilepsy for the last seven years. She had formerly two and three attacks per day; these are now reduced to one in six weeks. She has taken until now 955 grammes of the bromide without any ill effects.

In obstruction of the nasal duct, with or without lacrymal tumour, Dr. May Figueira has given up the operation with the knife, and canulas. He now uses with great advantage daily injections through the lacrymal points, first with plain emollient liquids, gradually proceeding with astringent liquids; he teaches the patients to use the syringe, and they soon find that by daily washing out the sac, they prevent the formation of the tumour, and the symptomatic conjunctivitis which is so difficult to cure.

Dr. May Figueira's experience of animal vaccination is very favourable, having obtained very good results; and though there has been lately an epidemic of small-pox in Lisbon, as yet he has seen no case of any one attacked who had been vaccinated. *A propos* of this, he quotes a remarkable case. At a patient's house he vaccinated with lymph from the heifer a maid-servant who had never been vaccinated; at the same time and with the same lymph he vaccinated another maid, who had had small-pox in a very confluent form ten years previously. On the first the vaccine did not take, and on the second three large pustules were formed; he then revaccinated the first one with lymph from one of the three pustules of No. 2, and again no effect was produced.

To conclude Dr. May Figuera's interesting observations, I must add one more item, and that is, his mode of preserving animal tissues for the microscope. He uses the acetate of ammonia (spirit of Mindererus) with very perfect results. This I believe is quite a novelty.

Animal Vaccination.

At the request of Dr. Lisboa, one of the delegates of the Board of Health, and Alderman of the Municipality of Lisbon, this corporation allowed experiments to be made at the slaughter house, in order to obtain a supply of animal vaccine.

The animals selected for the experiments were calves and heifers, of different ages, up to six months. The experiments were made with cow-pox virus, offered by Dr. Bernardino Antonio Gomes, who had obtained it from Drs. Lanoix and Depaul, of Paris. The human lymph was offered by Dr. Lisboa, and obtained from the Vaccine Institute.

The region selected for the inoculations was the inferior right side of the animal, on the space between the groin and the udder. Some inoculations were made round the vulva, but these appeared not to allow of sufficient development, and to render more difficult the extraction of the lymph, owing, no doubt, to the small quantity of subcutaneous connective tissue in that region.

The region selected was shaven, the inoculations made, and then covered with *baudruche;* this precaution seemed useless, and was soon abandoned.

The inoculations were made with a lancet, incisions with a bistoury, and with a lid scarifier, the second seemed to produce larger pustules, and more lymph.

The form of the pustule is different, according to the manner of inoculation; if the operation is performed with the point of a

lancet, the pustule is circular; when an incision is made, it takes the shape of a coffee bean, but, in both cases, the pustule is umbilicated.

Two cases of cow-pox appeared in one of the model cow houses in Lisbon, but, unfortunately, when inspected by the medical men, the disease was too far advanced to be available.

Twenty-seven experiments were made at the slaughter house, all of them conducted by Senhor Joaquim Salimo Eleuterio de Souza, veterinary surgeon of the establishment; the following are his conclusions:—

1. That the transmission of cow-pox from heifer to heifer is easily obtained.

2. That on all the animals inoculated no bad symptom occurred attributable to vaccination.

3. That in eleven transmissions of cow-pox sent by Dr. Depaul, the pustules showed in every case the same characters and degree of development.

4. That the time necessary for the pustules to show lymph in good condition is from three to six days, at the end of which time it becomes turbid and purulent.

5. That the eruption was always limited to the region inoculated.

6. That the inoculation of cow-pox in heifers or calves does not determine any sensible general reaction.

7. That a heifer which yields more than twelve pustules (which is easily obtained) can supply virus to vaccinate more than 300 persons.

8. That the best means of preserving the lymph is to receive it into capillary tubes dilated in the centre. Sometimes the lymph adheres to the sides of the tube in such a way that it is difficult to get it out by blowing; a horse hair passed through will easily avoid this difficulty.

9. That the extraction of lymph is easily made by seizing the base of the pustule with a forceps, and squeezing out the lymph slowly. It is very rare to see blood mixed with the lymph when this operation is carefully done.

Dr. Bernardino Antonio Gomes and Senhor Martius have, on frequent occasions, employed the animal vaccine taken from the heifer at the slaughter house. Both these gentlemen speak encouragingly of the results, and intend publishing their observations; others however do not report so favourably. One hundred tubes of this lymph were sent to Porto, and vaccination was practised

by the delegate of the Board of Health, and by Dr. Ozorio, at the Foundling Hospital. Both inform me that the result was negative. At the Foundling one child presented a small pustule, from which no lymph could be taken. Of the forty-one cases I saw vaccinated not one took.

Small-Pox.

I have just been presented with a most interesting work, written by a patient of mine, Senhor Joaquim Ferreira Mautinho, on the Province of Matto Grosso (Brazil). Having resided there for eighteen years he is quite an authority. Among very many interesting pages, I find one on the epidemic of small-pox, which occurred at Cuiabá, capital of this almost unknown province of South America. This was the first epidemic of the kind that had ever invaded Cuiabá. The healthiness of this town was always considered remarkably good, in spite of the surrounding districts being very unhealthy, particularly in the gold and diamond mines.

Vaccination had never been practised, except on a few children at the public schools, the repugnance of the natives was so great that the parents of those children who had been vaccinated at school would inflict severe punishment on them for having allowed the doctor to mark them.

It is a remarkable fact that since Cuiabá was discovered and populated, 150 years ago, no case of small-pox had ever been seen, whereas, in other towns of the province, the disease had caused great ravages.

At the time of this epidemic it was ascertained that only 2,500 persons had been vaccinated, *id est*, one-fifth of the population.

The introduction of this disease was owing to an order issued by one of the Paraguayan officers to inoculate the Brazilian prisoners with matter from cases of small-pox which had then appeared at Corumba, and sending the soldiers with drying pustules to Cuiabá. This was the starting-point of that fearful epidemic, far more deadly than any other on record.

The thermometer was at that time 91° in the shade. The want of proper resources was so much felt, that, to get rid of the dead, carts were driven along the streets day and night collecting the dead bodies from every house, out of which owner and slave, husband and wife, mother and child were tumbled into the vehicle, carted away as so much filth to the Cae-Cae, where they were piled up one over the other into a heap, covered with dry leaves, and burned, or rather roasted, the remains being devoured by the

dogs, pigs, and crows. The dogs had taken such a liking to human flesh that they would enter the houses and devour the bodies of those that had been abandoned after death. Besides the horrible filth of every description, the smoke from the burning bodies formed such a dense cloud over the city, that it was suffocating in the extreme. The author passes in review the different epidemics of small-pox related by Rhazes, Sydenham, Friend, Lobb, Cross, and others, and remarks, that none were of so malignant a type as the one at Cuiabá. Most of those suffering from other diseases were carried off very rapidly. The mortality was infinitely greater at Cuiaba than in any other place where epidemics of small-pox have occurred. Even those of the British Isles in 1818, and that of France in 1825 and 1828 were not so mortiferous. Half of the population died, and the remainder were hideously disfigured, and cachectic.

Senhor Mautinho wishes to show by these details that the prophylactic power of vaccine matter is far greater than is generally admitted. He quotes a great many names of persons well known to him, who had been vaccinated during their infancy, who were constantly exposed to danger without having been at all influenced by it. It was known that only 2,500 persons had been vaccinated of whom only one died, this one was a slave.

Comparing the mortality of Cuiabá, 6,000 deaths out of a population of 13,000, with that of the black plague in Moscow, Syria, Marseilles, Turkey, the borders of the Danube, Malta, Messina, Naples, Venice, etc., none have shown such a mortality. Can any one doubt the wonderful prophylaxy of vaccination !

The Vaccine Institution of Lisbon, directed by Senhor Bourquin and Senhor Campos, Vaccinators to the Extinct Board of Health at Lisbon.

These two surgeons have established an Institute for Vaccination which has been a great boon to this city. The regularity of their proceedings, the pureness of the lymph, and the correctness of their statements, are most reliable, they have consequently secured the patronage of their colleagues, and that of the upper classes of society.

Their year begins on the 1st of April and ends on the 31st of March. It has now been at work for 16½ months.

They refute the two accusations made against Jennerian vaccination :

1st. That vaccine lymph has degenerated, and has lost its preserving power.

2nd. That it is capable of transmitting syphilis.

The first of these accusations has been chiefly made in France and Italy; as yet in Portugal no one has said a word against it, and from all experience it appears that pure lymph has retained its preserving power as much as formerly. As regards the second, there is only one fact, published five years ago by Senhor Matta, one of our colleagues. The case was that of a child, which presented chancres on the vaccine pustules, besides other general symptoms which that gentleman considered characteristic. The child was not kept under observation, and had been vaccinated by a midwife, a class of persons who, as we know, are very ignorant on such matters. Messrs. Bourquin and Campos have been vaccinators in Lisbon for the last thirty years, and as yet have never seen one case of vaccinal syphilis. They believe it, therefore, to be very rare, and that it is impossible if the vaccine is well selected, and care taken that no pus or blood is carried on the point of the needle, etc. The Parisians, in these gentlemen's opinion, have greatly exaggerated the cases, and in their desire to introduce animal against Jennerian vaccine there is a certain itching for innovation *à tout prix*.

During their first year, 1868-69, they operated on 237 cases, made 20 revaccinations, besides repetitions in cases of failure.

Out of the 237 cases, 128 were males and 114 females.

Complete result	163
Doubtful	4
Vaccinella (false)	2
Failures	29
Did not return for inspection . . .	39
Total . . .	237

Deducting from the failures (29) those who had small pox marks (12) the number of failures is reduced to 17 only.

The 163 cases of complete result showed—

Vesicles on right arm	488
Vesicles on left arm	299
	787

These figures seem to show that the Jennerian lymph has not lost much of its former virtue. In 1869 there were 93 deaths by variola, in private dwelling houses, in the three districts of Lisbon. The death certificates showed—

Not vaccinated	82
Vaccinated	8
Unknown	3
	93

Of the revaccinated cases, 14 were males and 6 females, total 20:

Complete result	0
Vaccinella (false)	5
Doubtful	2
Failures	12
Did not return for inspection	1
Total	20

In children the result of revaccination was almost always nil.

Animal Vaccination.

Three series of experiments were undertaken by these gentlemen with animal vaccine taken from the heifers at the slaughter house.

1st Series on 28th July, 1869.

A child was inoculated with animal vaccine on the left arm, and was vaccinated from arm to arm on the right. The result was failure of animal vaccine, and two vesicles on the right arm.

2nd Series, 4th August, 1869.

Five children were inoculated with animal vaccine on the left arm. The lymph was taken from a heifer on the fifth day of its evolution, and two days before its inoculation. The right arms were vaccinated with Jennerian lymph. Result: failure of animal vaccine and 15 Jennerian pustules on right arms.

3rd Series, 15th December, 1869.

Two children were vaccinated on both arms with lymph sent from Paris by Mons. Depaul. Failure. A week after they were vaccinated with human lymph—the result was perfect.

These gentlemen are proceeding with their experiments this year, and cannot as yet come to any definite conclusions.

New Lunatic Asylum at Porto.

Count Ferreira, the Portuguese Peabody of Porto, in his will left £150,000 for the building and support of an hospital for the insane, also a sum for the building of 120 public schools, to be distributed about Portugal and the islands. Of these upwards of 100 are completed. The hospital is being built under the management of three legatees, who have hitherto been most indefatigable in carrying out the testator's views.

The building is being erected in a lovely spot in the suburbs of Porto, surrounded by undulating grounds, covered with trees and wild flowers, and an abundance of water. The property is divided into two parts by one of the great roads leading to the north of Portugal. That part on which the edifice is being erected has a superficial area of 11,191·40 ares (each are is equal to 4·84 square metres); the other side has 7,675·75 ares.

The hospital is composed of two parallel blocks, each of which measures 178·80 metres in length; the distance between each block is 65·60 metres; these two blocks are perpendicular to a line running north and south, so that the wards and dormitories have their windows facing north and south.

The building occupies a space of 1,566·28 ares. The kitchen and other dependencies, as well as the theatre, the department for the furious and suicidal maniacs, project backwards, and occupy a space of 93·15 ares. The width of the building occupied by the dormitories is 11 metres, including the walls; and the centre part, occupied by the administration department, is 10 m. 50 cmt., including the walls. The shape of the building is that of a double H, thus ⌶; the rectangle limited by the bars of the letter H contains the manager's department; the remainder is devoted to the dormitories. In these the patients will be separated by sexes and diseases. Should the present plan not be altered, the pacific insane will sleep in rooms containing thirteen and nine beds each, and the agitated will be placed in separate rooms containing one and two beds each.

				Dimensions.	
				Square metres.	Cubic metres.
There are	8	dormitories with	13 beds each	79·56	490·885
,,	6	,,	9 ,,	53·04	327·257
,,	40	,,	2 ,,	12·71	72·065
,,	40	,,	1 ,,	9·45	53·582
,,	80	for private patients	1 ,,	—	72·065

These eighty rooms for private patients have the same cubic space as the rooms for two ordinary patients.

The dormitories for thirteen beds have each three windows and two doors leading on to a gallery.

Those for nine beds have two windows and one door.

Those for two beds, one window, and the private patients' rooms have each one window.

The space between each window, measured from the centre of the windows, is four metres; in two wards, destined for the treatment of accidental diseases, the space from centre of one window

to centre of next is 4 m. 40 cmt. All the windows are 1 m. 40 cmt. wide; one-third are 3 m. 30 cmt. high, another third 3 m. 30 cmt., and the remainder 2 m. 85 cmt. These different heights correspond to upper stories and ground floor.

The water supply is very abundant. Three springs supply excellent drinking water, besides nine wells, which at an excessively dry time of the year, when water was very scarce, yielded 43,000 litres in twenty-four hours. The managers intend collecting all the water in a common reservoir by means of a steam pump, and with the same engine throwing it to the top of the building, to be from there distributed to every part of it. The hospital is built of the finest Porto granite, is simple in its architecture, yet from its size and good proportions forms a very fine and imposing edifice. To prevent the dampness from penetrating the granite, which is very porous, it is proposed to oil it or wash it with the silicate of potash solution, thus forming an impervious coating.

Senhor José Gaspar da Graça, the indefatigable legatee and manager of this grand edifice, has been most obliging and generous in supplying me with every information I could wish for, and in showing me every detail that could be of use; to him and to Senhor Ribeiro, the able architect, I tender my warmest thanks.

Since writing the above I hear that of the 120 schools, 117 are already finished.

ITALY.

Report by J. B. Sammut, M.D. (*of Naples*).

(The Translations by Dr. Ribton.)

During the course of the present year I have solicited from the most distinguished professors of the Italian Peninsula a notice of the circumstances most worthy of record which they have happened to meet with in the exercise of their individual practice, intimating to each, at the same time, that the accounts which they furnished should be forwarded as contributions to the "Reports on the Progress of Medicine in different parts of the World." In reply I received the articles which I now send. They are, indeed, by no means numerous, nor are they sufficient to afford an exact idea of the march of science in Italy. Such a scarcity of communications arises from two fundamental causes, which it will be, perhaps, not unadvisable to discuss somewhat at length.

Italy, although politically and geographically united for nearly ten years, has not yet truly become one country. The immense individual vitality of its different parts has not, as yet, become levelled by the plebiscite, but has continued, to a certain extent, in the same proportions in which it existed previous to that in each separate province. This condition of affairs, as is natural, makes itself felt in all the various branches of human industry, amongst which certainly the science of medicine does not hold the lowest place. Hence it is that he who would seek in Italy an Italian system of Medicine, would find himself totally mistaken, for he would find instead a Neapolitan system, a Bolognese system, a Florentine one, &c., which, if they have all of them followed the new experimental and physiological direction of science in words, have, nevertheless, each taken the impress of a different movement corresponding to their own peculiar traditions, according to the degree of development of each, and the individual character of their separate advocates. Now it arises from this, that medical labour is separated into detached portions, and bears an individual rather than a collective character. The social harmony which formerly did not exist, owing to the political condition of the country, has not been able, as yet, to strike any deep roots,

owing to the diverse conditions of existence of the several parts of the nation. For which reason each individual labours only for himself and by himself, because he feels little need for comparing his observations with those of others, having never experienced the advantages of so doing; whence the interchange of ideas is difficult, in fact, it may be said, not to exist at all. The consequence has been, that the invitation which I circulated amongst the faculty did not receive that attention which, after some years more, such a request will be sure to obtain.

The other reason rests in *the language* in which your Annual Reports are published. For it is painful to state the fact, yet it is nevertheless true, that amongst the studious class the English language is very rarely cultivated in Italy, differing, in this respect, from the German and the French, which are quite familiar to every person, even of moderate literary attainments. As the means are, therefore, wanting for knowing the facts that take place beyond the Channel, and of appreciating their importance, it is only natural that, with the exception of those few who possess those means, all the rest should give themselves but little trouble to contribute to the work.

Now, these reasons, as it may easily be understood, are only transitory, and not permanent; and there can be no doubt that, in a country whose intellectual power is second to none, they will soon have disappeared.

I shall, perhaps, be blamed because, when conscious of these obstacles to the contributions of the medical men of the country, I did not personally make a collection of as many observations and facts as it was possible for me to obtain, and send them to you. Apart from the material difficulties however of such an undertaking, every one will readily understand that my work would not have succeeded in its object, both from the scarcity of materials that were placed at my disposal, and also from the very limited time which I could command amidst the anxious duties of private practice.

Before closing these few observations, I believe it to be indispensable, in order to dissipate a prejudice that has gained a considerable amount of credence in England and elsewhere, that I should say a few words upon the subject of medical science as it is at present in Italy.

It is deeply to be regretted that the science of medicine in Italy has been unjustly calumniated in other countries. It has so happened, evidently because two epochs have been confounded that are separated from each other by a lapse of nearly half a century—

the present epoch and that of Giacomini, Rasori, &c. The most considerable and real reform in medical science began to manifest itself distinctly in the year 1840, or about that time, just when the germinal forms of organised matter began to be determined; that is to say, when, through the form of the primitive elements of our tissues, a complete knowledge was obtained of the nature of organic matter in its concrete substance; when the poetic conceit was abandoned of an animal chemistry, *sui generis*, which governed the organised system after its own laws, and when, instead, the chemistry of inorganic nature established its rights over organic matter also; when pathological anatomy, abandoned by the disciples of the *contra stimulus* school, revived and presented itself as the genuine foundation of the material forms of disease as studied in all the phases which it presented; and when, finally, pathology, having no right to establish itself as an independent and absolute science, was only regarded as the physiology of disease, and this latter as only a particular form of normal physiology—then it was that the physiological method of investigation began to be introduced in the study of disease, and the chemical and mechanical form of normal life was understood to comprehend the so-called morbid life. Illustrious minds laboured, and still labour in this direction, and in the present day the medical science of nature has overthrown for ever the medical science of romance, and in place of the madness of speculation, it has substituted the plain results of experience and observation. Italy venerates, without any feeling of jealousy, the great masters of other nations, and especially those of Germany, who have given birth and progress to our science, but she does not feel herself to be fallen so low as others would seem to believe. In this land, which is the native country of Galileo, Volta, and Galvani, there lives always that power of investigation which leads to great results; and that power, although paralysed in part by the political shocks by which the Peninsula has been torn, will not be slow, nevertheless, to corroborate the observations just made, and to enrich science with new doctrines. With these reflections, which have taken almost a prophetic turn, I bring this introduction to a termination, with the firm conviction upon my mind that, ere long, I shall have to renounce the mystic tone of the prophet for the clear and severe language of the historian.

Professor Francesco Rizzoli, surgeon of the first class in the Spedale Maggiore of Bologna, has kindly forwarded to me his

work, entitled "Collezioni di Memorie Chirurgiche ed Ostetriche." I do not think it necessary to make an exact exposition of the very important novelties, and of the valuable clinical observations that are brought forward in his book, first, because they do not belong to the year that is passing, and secondly, because they have already been published in detached portions in medical journals, both Italian and foreign. I will record only a few proceedings of the illustrious author, which, if they do not appear new to all, it is nevertheless opportune that they should be continually called to mind, so that from the narrow confines of a book, or of a journal, they may pass definitely into the routine of practice.

What especially is taken into consideration is the subject of forced parturition, in the case of women dying during pregnancy even without labour pains, as a substitute for the cæsarian section.

Professor Rizzoli, considering that, notwithstanding the progress of science, it is impossible to be certain of the reality of death unless traces of putrefaction appear, considering that, even when it is well established, the cæsarian section proves almost always useless for the fœtus, as it is with but very few exceptions, extracted dead from the maternal womb, and considering also, that experience has established the value of the method which he advises, inasmuch as *some pregnant women who were believed to be dead were not so in reality*, and through his method were afterwards enabled to enjoy a prosperous life, without any injury having arisen to the fœtus owing to the operation itself, maintains upon forcible grounds, that from pregnant women, either dead, or presumed to be so, the fœtus should be extracted through the natural passages, even when labour has not been yet declared. In case of the operation being opposed by a mechanical obstruction, then only should it be deemed expedient to have recourse to gastro-hysterotomy.

The gradual dilatation of the cervix uteri with the finger, that is, when the uterine orifice is sufficiently large to admit of its introduction, is preferred by the author, even when it is necessary that delivery should be accomplished with a certain amount of expedition.

In such a case the patient is placed upon her back, with the nates raised, and the palm of one hand is placed upon the fundus uteri, so as to lower it, and render more easy the introduction of the forefinger of the other hand within the uterine orifice, while, with the point of the same finger, an endeavour is made to detach, as far as is possible, the membranes of the ovum from the surface of the inferior segment of the uterus; after which, by turning it

round, and gently stretching outwards the edge of the orifice, an effort is made to enlarge it gradually.

A dilatation of such a harmless nature may be repeated two or three times, until, at length, the tissues that constitute the uterine orifice, not having undergone the least irritation, very soon admit of the introduction, not only of the first, but also of the middle finger, and thus the dilatation becomes still more expeditious. By carrying on the operation after this manner, Professor Rizzoli states that after two or three days labour will begin to manifest itself; but if it still delays he recommends suction of the nipples of the breasts to be practised, and to be repeated several times in the day. In case that such a process should not be practicable, owing to narrowness of the cervix, then he has recourse to the instruments for mechanical dilatation which are used under such circumstances.

Professor Rizzoli has had recourse to mechanical dilatation of the cervix in the manner above described, not only when the urgency of the case compelled him to bring on artificial premature labour, on account of peculiar contraction or deformity of the pelvis of a pregnant female, but also, when, on account of an incurable disease there only remained for the mother a few days of painful existence, and the fœtus was still living, in order to save the latter with greater certainty. When, also, the nature of the malady is by chance such as to afford a possibility of recovery only by relieving the uterus of the products of conception, the same operative proceeding presents itself very opportunely to save the life also of the mother; it being well understood that should there not be sufficient time, then no other resource remains except to penetrate the uterus with as much speed as possible, and with the necessary precautions, so as to extract the fœtus either with the hands or with the forceps.

Professor Cantani not having, as yet, published his investigations on the subject of diabetes mellitus, gives to the "Morgagni" an anticipatory communication, describing his method of treatment, together with a succinct account of five cases that were treated in his clinique.

It is his firm conviction that in the organic economy of diabetic patients, sugar does not exist as a combustible; that which is eaten, or formed from amylaceous substances, instead of undergoing progressive transformation so as to give products completely combustible, as would be lactic acids or fats, is subject to an abnormal transformation, which renders impossible its ulterior combustion in the system itself.

It follows, then, that the sugar passes out undecomposed with the urine, the diabetic patient consumes all his own fat, and the many albuminates and fats which he eats do not suffice for the combustion of his system; even the very albuminates of the organic tissues are consumed, whence arises the excessive increase of hunger, the insatiability of the patient, and the low temperature (35°—36° centigrade) observed in all the cases as long as they exhibited diabetic symptoms. The increased combustion of the fats and albuminates replaces in diabetes the deficient combustion of the saccharine, and relatively of the amylaceous materials.

The professor asserts that he has reason to suspect that diabetic sugar, as long as it is found in the blood, differs from glycose, although afterwards in the urine it gives the same chemical reactions as the latter, whence he proposes to call it *paraglycose*.

It seems to him also that the sugar of the muscles can itself also, in part, when conveyed into the blood, become transformed into that species of diabetic sugar which at present is, perhaps, erroneously considered as glycose, and so escaping from complete combustion, it may take no inconsiderable part in the continuation of melituria, even after every atom of non-albuminous food has been withdrawn; certain it is that at times it appears untransformed in the urine, as inosite.

The gelatinous or collagenous tissues of the flesh, which Bodeker succeeded in transforming into sugar out of the system, may themselves also, probably under determinate pathological conditions, be subjected to this transformation even within the living system.

The Professor has deduced from various considerations on the possible nature of diabetes, and on the quantitative analysis of the urine of many diabetic patients, that this disease is to be treated partly by a diet exclusively albuminous, and partly with substances which, being more certainly combustible, may take the place of the sugar which, in diabetes, is not burned, and may spare the albuminates in the system for the maintenance of its plastic life. He turned his attention accordingly to the fats, which, although tolerated in surprising quantities by diabetic patients, were not sufficient for the purpose, and it was then that his theoretic views led him to try sour milk and lactic acid, from which, above all, he obtained successful results. In short, his treatment of diabetes is now rigorously fixed within these simple limits. The patient must limit his diet exclusively to meat, fish or shell-fish, or, in fact, to albuminous aliments, prepared so that not a particle of bread, of sugar, or of lemon juice shall enter therein. The meat should be simply roasted upon the spit,

broiled upon the gridiron, or boiled, and served with nothing but salt and butter. The patient should drink nothing but water, either plain, or acidulated with lactic acid. Of this latter he should consume from five to ten grammes every day, taking it *epicratically*.

With this treatment he has had results that surpassed any that he had previously obtained with Vichy or Carlsbad water, and with the alkaline carbonates in general.

A Manual of Clinical Chemistry, exhibited in an easy and rational manner, under the triple aspect of Diagnosis, Prognosis, and Therapeutics. By Dr. Gaetano Primavera, *Professor of Clinical Chemistry in the Clinical Hospital of Naples.*

The principal object of this work is to render chemical researches popular amongst practising physicians; not only such as are directed for the discovery of morbid materials, and especially for the analysis of urine, but also for the examination of drugs suspected of adulteration; for which reason the author has endeavoured, as far as possible, to limit the number of reagents, and to simplify the analytical operations that are indicated. Having been engaged in constant work for many years in the first Clinical Hospital of Italy, placed under the direction of the distinguished Professors Tommasi, Cantani, Tanturri, Gallozzi, Castorani, Tarsitani, Buonomi, and Cardarelli, he has been enabled not only to study profoundly the science which he professes, but also to make important discoveries in the application of chemistry to the practice of medicine, and especially with regard to the composition of the urine. As space does not admit of my taking notice of the entire work, I shall give an abstract of the more prominent scientific novelties contained in the First Part, which treats entirely of the urine.

And, in the first place, a long chapter upon the functions of the kidneys is deserving of notice, where it is maintained by arguments of every kind (clinical, physiological, anatomical and chemical), that these organs are not mere *filters*, but also real *laboratories*; and that the urea, the uric acid, and certain pigments, at the very least, are elaborated directly in them, and not in the blood, or in the tissues in general, as is most generally believed.

In the paragraph on the *chlorides*, their great diminution or disappearance is shown to be entirely destitute of importance, either for diagnosis or prognosis, inasmuch as such is clearly demonstrated to be merely the effect of the lengthened, severe and

poor diet to which patients, suffering from pulmonary diseases, typhus, &c., are subjected, in whom especially it is the custom to verify the condition of *achloria*.

In the paragraph on the *phosphate of lime*, the general law is established of its rapid diminution even to total disappearance from the urine of all fever patients, to reappear when recovery is established. An exception to this law is made in the case of those acute rheumatisms which are not rapidly resolved, and of all those fevers which tend to the irritation and inflammation of the great nervous centres, and their involucra (the brain, spinal marrow, meninges); for there the phosphate of lime reappears in the midst of the disease, and is even present, most generally, in great abundance.

In the paragraph on the *phosphate of magnesia*, another law, completely new, is established, which is, that in all the severe fevers, and especially in the fever of pneumonia, and in typhus, this salt first diminishes to total disappearance during the period of increment, and then reappears rapidly and in great abundance when the resolution has commenced. Also, the author has found this same salt much increased in muscular progressive atrophy.

In speaking of the *phosphates in general*, the reagent which is considered the best is the following, which is not new with regard to the nature of its components, but rather as regards the proportion in which the same are employed, by which this reagent is freed from the serious inconvenience of precipitating also the carbonates. It is prepared with *three* grammes of simple sal ammoniac, *one* of sulphate of magnesia, *four* of liquid ammonia, and sixty of distilled water.

For the analysis of the *ammoniacal carbonate* the following method is employed:—A test tube is filled to about half its length with the suspected urine; upon its open extremity is laid a small piece of litmus paper, slightly reddened and moistened, and the liquid is heated to ebullition; after a few moments, if an ammoniacal carbonate is present, the paper resumes its blue colour.

In the paragraph on the *urates* there is a very simple method for discovering the abundance of these salts, where they remain dissolved even after the cooling of the urine. It consists in adding to a sample of the latter a couple of drops of hydrochloric acid; a cloud that appears more or less rapidly and copiously, and disappears on the reapplication of heat, indicates that the urates really exist there in abundance. With regard to the clinical value of these salts we are pleased to record one fact that is entirely new,

which is that in the course of typhus they indicate an aggravation when they become scarce, and an improvement when they become more abundant.

In the paragraph on the *urea* the author establishes a new method of analysis for clinical purposes, as the ordinary one, the volumetric method, with nitrate of mercury, appears to him difficult and defective, inasmuch as this latter salt precipitates many other organic substances as well as urea. He accordingly recommends us to take fifteen grammes of urine, reduce them to one-fourth by slow evaporation, and to add immediately a volume of nitric acid at 40° (of the areometer of Baume) equal to that of the reduced urine, after which it only remains to place the capsule containing the mixture to cool in a vessel of cold water. If after this the whole appears to coagulate, so as to resemble a completely solid cake, the urea is considered abundant; if this cake exists with a moderate quantity of liquid the urea is reckoned normal; and, finally, if no cake, or scarcely any, appears, and no trace of crystallisation, it will signify that the urea is present in very small proportions. The author with this method has always obtained the last mentioned result in the urine of patients in the second or third period of chronic Bright's disease. It is to be understood that in these cases, previous to analysing for urea, the albumen must be removed from the urine by coagulation with heat and acetic acid, and subsequently filtration.

In the chapter on *pigments*, after having noticed the great confusion that exists with regard to their number, the methods of their analysis, and even their nomenclature, the author states that, from the examination of from fifteen to twenty thousand specimens of urine, he is led to admit the following pigments:—1st, urophœine; 2nd, uroxanthine (normal urinary pigments); 3rd, uroerithrine; 4th, urocyanogene; 5th, uroglaucine (abnormal urinary pigments); 6th, bilifulvine; 7th, biliverdine; 8th, innominate biliary pigment (pigment of the bile); 9th, hæmatine (pigment of the blood); 10th, yellow medicinal pigment, derived from santonine, senna, rhubarb, &c., &c.

With regard to urophœine (for the analysis of which he prefers warm hydrochloric acid, instead of cold sulphuric, because this latter reagent may cause it to be confounded with various other pigments) there is this new fact, that it diminishes in quantity as long as the disease increases in severity, and augments as the patient begins to improve. The contrary takes place with regard to uroxanthine, which increases during the period of aggravation, and tends to return to its normal proportions when improvement

takes place. Then, with regard to uroerithrine, there is this to be noted especially, that it is most copious more particularly in advanced cirrhosis of the liver in perihepatitis, and in cerebral meningitis, while it is generally absent in cases of simple typhus, insomuch that the author assures us that more than once he has been enabled to perceive in time the approach of a true suppurative meningitis during the course of an attack of typhus merely by observing the appearance of a great quantity of uroerithrine in the urine of the patient.

The urocyanogen, which is confounded by Heller with uroxanthine, and is called by Fordos urocyanose, is discovered by the author by putting into a glass jar half full of urine, one third of its bulk of sulphuric ether and another third of pure and concentrated nitric acid, and rapidly pouring the whole from one vessel to another ten times in succession: at the end of this operation it is observed that, after a few minutes, the ether floats, carrying a blue colour, more or less intense, according to the quantity of the urocyanine, which is a product of the decomposition of the urocyanogen, just as murexide is a product of the decomposition of uric acid. As regards, however, its clinical value, it is as yet too vague for the search after urocyanogen to be considered really useful; by the author it has been found chiefly in the urine of cholera patients.

In treating of the biliary pigments there are also several new facts, amongst others the discovery of a new pigment, which is distinguished from the two generally known (bilifulvine and biliverdine) by its not reacting either with nitric or nitrous acid, nor yet with hydrochloric or acetic acid, while, like them, it dissolves in chloroform, imparting to it a canary yellow tinge. It does not indicate a regurgitation of bile through obturation of the great biliary ducts, but rather a deterioration of the vascular structure, or of the parenchyma of the liver; wherefore it is met with in hepatic congestions, in the nutmeg liver, in perihepatitis, in incipient fatty degeneration, and also most especially in *chronic* interstitial hepatitis, up to the period of incipient cirrhosis, when it is for the most part *constant*. In very advanced cases of cirrhosis this pigment entirely disappears while the uroerithrine increases in the urine; so that now there has been obtained a very positive diagnostic method of discerning even the period of chronic interstitial hepatitis, a method that can be employed even when percussion can effect nothing by reason of the intervention of the peritoneal serum. It is to be remarked also that by the discovery of this pigment—which always accompanies slightly marked,

or imperceptible jaundice, with coloured fæces—the author believes the very recent question of the non-existence of *hæmotogenate jaundice, i.e.*, jaundice arising from transformation of the hæmatoglobuline in the blood itself, entirely solved; against which form of jaundice he adduces many excellent arguments drawn from chemistry, from experimental physiology, and most especially from clinical observation.

In the paragraph on *hæmatine* a new method of analysis is given which consists in treating the urine with tannic acid, and boiling it; the hæmatine, whether it be diffused or under the form of globules, reveals itself by the formation of blackish flakes that rise towards the surface. This method, according to the author, while for delicacy and certainty it is fully equal to that of Heller, who employs caustic potash, is entirely free from the inconveniences with which this latter is beset, and which may be reduced to three:—first, the absence of the earthy phosphates; second, the accidental presence of some yellow medicinal pigment; third, the presence of a small quantity of glycose.

The chapter on *albumen* is the longest of all, and, perhaps, also the finest and the most important. In it not only all the methods of analysis are passed in review, amongst which the author prefers that of coagulation by heat with successive additions of acetic acid, but also all the theories which up to the present day have been invented in explanation of the different forms of albuminuria, whether as considered passing and symptomatic, or essential and indicative of Bright's disease. Finally, in order to distinguish practically all these forms of albuminuria, he has given several criteria, of which I refer with much pleasure to the following:—

1st. Urines with a small amount of albumen (from one to six grammes in the twenty-four hours), more or less strongly coloured, and of a specific gravity, either normal or, still better, increased, exclude with almost absolute certainty the possibility of any serious injury to the parenchyma of the kidneys, and indicate, on the other hand, either certain febrile diseases, as, for example, typhus and pneumonia, or else those diseases of the heart, liver, spleen, &c., which are capable of mechanically obstructing the course of the blood in the renal veins.

2nd. Urines with a medium amount of albumen (from six to twelve grammes in the twenty-four hours), somewhat discoloured, and of a specific gravity somewhat diminished, indicate the first stage of chronic Bright's disease.

3rd. Urines with a large amount of albumen (from twelve to thirty grammes in the twenty-four hours), much discoloured, and

of a specific gravity somewhat diminished, indicate, with a certainty almost absolute, the second stage of chronic Bright's disease, called hypertrophic.

4th. Urines with a moderate amount of albumen (from six to twelve grammes in the twenty-four hours), almost entirely colourless, and of a very low specific gravity (from 1,005 to 1,010), indicate the last stage of chronic Bright's disease, called atrophic.

5th. Apart from all the above mentioned distinguishing characteristics between the albuminuria of Bright's disease, and the so-called passing or symptomatic forms, there is yet another still more important, which consists in the proportion that is found of urea and the urates; when this proportion is very small, it marks in the strongest manner the first species of albuminuria; when it is normal or increased, it marks in the same manner the other species in general.

6th. When the albuminuria is accompanied by cardiac disease, it is easy to recognise whether the former is the effect or the cause of the latter; for while, in the first case, the urine has all the characteristics of symptomatic albuminuria, in the second case it has, on the other hand, all the characteristics of the second or third stage of Bright's disease.

7th. Albuminuria in acute articular rheumatism, marks, with great probability the development of pericarditis.

In the chapter on *pus* and *muco-pus* there is to be observed, above all, a new and very delicate method of analysis, especially useful for discovering the morbid principle in those urines that present little or no turbidity. It consists in treating a sample of urine with a few drops of ammonia, then boiling, and lastly, giving to the vessel that contains it a movement of rotation. In this manner the small proportion of pus manifests itself in the beginning by taking the form of a spiral, and then collects itself on the surface of the liquid in the form of a little gelatinous pellet. With regard to its clinical value these are the principal conclusions of the author:—

1st. Muco-purulent urines, which at the moment of their emission, or a few hours afterwards, have an alkaline reaction, showing the presence of carbonate of ammonia, indicate vesical catarrh; 2nd, muco-purulent urines which have an acid reaction, even after several days, indicate pelvic catarrh; 3rd, urines entirely purulent, with acid reaction and low specific gravity, indicate acute interstitial nephritis; 4th, purulent or muco-purulent urines in general, provided they have a specific gravity that is normal, or still better, increased, exclude, with almost absolute certainty, the possibility of any deep-seated disease of the kidneys.

The chapter on *glycose* is deserving of notice for two things especially, both for the many and useful instructions that are given in the purely analytical portion of it, and also for its critical exposition of all the most celebrated theories with regard to diabetes mellitus, including that of Professor Pavy, to which the author chiefly inclines. He however agrees with Professor Tommasi in recognising as established beyond doubt the *double form* or the *double period* of this disease, that is to say, that there is one form in which the glycosuria ceases with the discontinuance of the saccharine or amylaceous diet, and another in which the same glycosuria never ceases entirely, no matter how prolonged or how rigorous the exclusively meat diet may be.

In the last chapter, dedicated to the subject of *urinary concretions*, there are many excellent views with regard as well to their origin as to their cure. I regret that the limits of my report do not permit me to speak more at length of this book.

GERMANY.

Report by JULIUS ALTHAUS, M.D., &c., *Physician to the Infirmary for Epilepsy and Paralysis.*

ANATOMY AND PHYSIOLOGY.

DESCRIPTIVE ANATOMY may, like astronomy, be looked upon as a science which it is hardly possible to advance; and although every year witnesses the birth of a number of new handbooks, and the publication of a number of observations, yet the progress actually made is not worth counting, except as far as lucidity of teaching is concerned. Henle's "Handbook of Systematic Human Anatomy," which approaches completion, may be considered as a pattern of professorial work. In *Microscopic Anatomy*, Max Schultze,* and his school, continue to gradually upset all the hitherto received notions of the structure of the different tissues; but it is impossible to give intelligible extracts from the work which is being done in the laboratory of Bonn, without the aid of plates, and it will take years before Schultze's teachings will have developed into a system that is to command the acceptance of the profession. Some of the chief papers, which have appeared during the year, are on the lymphatic courses of the eye, and their limits; on the dilatator pupillæ muscle in mammalia, men and birds; on the nerves of the salivary glands; on the beaker-shaped organs of the tongue; on the structure of the gastric follicles; on the ganglionic bodies of the cortical substance of the brain; on the terminations of the cutaneous nerves, and others.

Professor Alex. Rollett,† of Gräz, has edited a number of able papers, giving the results of investigations of himself and some of his pupils, on decomposition of the red blood-corpuscles; on the structure of the aorta, with special reference to its muscular coat; on development of osseous tissue; on the physiology of the

* "Archiv für microscopische Anatomie," vols. v. and vi.

† "Untersuchungen aus dem Institute für Physiologie und Histologie in Gräz." Leipzig, 1870.

intestinal juice; on the development of the batrachians; and on the stasis of blood in the vessels of inflamed parts.

Professor Virchow* has had the opportunity of making a *post mortem* examination in a case of *suicidal arsenical poisoning*, which ended fatally. The dose was a table-spoonful of white arsenic. There was no cauterisation of the stomach perceptible, but the principal thing found was gastro-adenitis parenchymatosa, with infiltration of the interstitial tissue, while in the intestines there was extensive swelling of the solitary follicles and Peyer's patches, whitish turbidity of the thickened mucous membrane, veins distended with blood, fæces devoid of bile, like rice-water. The microscope showed countless multitudes of extremely fine vibrios and bacterides, corresponding to Klob's cholera fungi. The Professor draws attention to the similarity of the *post mortem* appearances in several cases of acute arsenicism with those noticed in cholera, in which severe forms of parenchymatous gastro-adenitis are by no means rare.

Pflüger's "Archiv der Physiologie" (Bonn, 1869—70) maintains the high character it has already established. In those parts which have appeared during the current year, Professor Wundt discourses on the alterations of excitability in the electrotonic state, and the rapidity of propagation of the nervous force; Gruenhagen on the motions of the iris; Schenck on the relations of ammonia as a product of excretion; Nasse on the excitation of the nerves by positive and negative variations of the current; Volckmann on muscular fatigue; Engelmann on general physiology of the nerves and muscles; Place on the rapidity with which nervous force is propagated in the motor nerves of man; Lamansky on the negative variation of the working muscle; and Exner on intermittent irritation of the retina.

Dr. Küneke,† of Celle, has endeavoured to "refine the physiology of labour into an organic physics of labour," and considered the physical relations of the "*four factors of labour*," which, according to him, are mechanical, organic, dynamic, and plastic. It is impossible to give an epitome even of the table of contents of this work, which will, however, no doubt, be of considerable interest to the scientific obstetrician.

* "Archiv für patholog. Anatomie," vol. xlvii. p. 529.

† "Die vier Factoren der Geburt." Berlin, 1869.

Chemistry and Pharmacy.

The influence of silver upon the blood and animal tissues has been investigated by M. Bozorlowsky.* In order to avoid the coagulating effect which most silver salts have on the blood, he used chiefly the sulphide of silver and soda, and the peptonate of silver, as well as the albuminate of the same metal. Thirty parts of fibrine-peptone will dissolve one part of nitrate of silver. This solution is absorbed from the cellular tissue, without causing caustic effects; but, on the contrary, it counteracts the coagulability of arterial blood on being directly mixed with the same. The author has minutely described the changes which the blood corpuscles undergo when mixed with that solution. If animals are fed with silver for some time consecutively, the quantity of urine appears diminished, its specific gravity increased, the fæces considerably increased, and of a dark yellow or chocolate colour, and the temperature diminished by several decimals. If rabbits received daily 0·01 to 0·1 grammes of the double salt, they died on the average after 40 days. *Post mortem* appearances were, increased darkness and liquidity of the blood, catarrh of the trachea and the intestines, swelling of the liver-cells, and the epithelium of Bellini's tubules; medullary substance of the kidneys more hyperæmic than the cortical substance; silver, and, in many cases, albumen in the urine, and silver in the bile, the gall-bladder being full of bile. The muscular fibres of the heart, and other muscles showed granular disintegration, but not marked fatty degeneration; the adipose tissue was atrophied, the intermuscular cellular tissue degenerated; general stagnation of blood, and transudation of serum into the pleura and pericardium was frequent.

M. Stscherbakoff,† of Kasan, in a paper on the analysis of certain pathological liquids, has come to the conclusion that the only accurate method of determining the *quantity of the albumen in the urine* is that recommended by Professor Hoppe-Seyler, by means of the polarisation apparatus. If the coagulated albumen is weighed, errors are sure to arise, because part of the albumen will always remain in solution. As the quantity of the latter may be equal, or even superior to that which has been precipitated, the faults inherent to this method must be very considerable, especially when there is only little albumen in the urine.

* "Archiv für patholog. Anatomie," vol. xlvi. p. 409.

† "Deutsches Archiv," vol. vii. p. 298.

The physiological effects of *alcohol* continue to attract the attention of experimentalists. Neumann,* who gave for some time consecutively daily quantities of alcohol to dogs, sufficient to intoxicate them, found that *internal hæmorrhagic pachymeningitis* may be the consequence of it, but is by no means invariably so. Sometimes it occurs after four weeks of this plan, while in other cases the dogs may get tipsy every day for months without their meninges suffering from it. In several animals a small piece of the skull-cap was removed by trephining, and it was then possible to perceive distinctly a dilatation of the cerebral vessels, within from five to twenty minutes after the alcohol had been imbibed. If the quantity of the substance was, however, very large, there was either constriction of the vessels, or irregular dilatation and constriction. The temperature falls not only after large, but also after small doses.

M. Bouvier,† has applied himself chiefly to the study of the *variations of temperature* observed after the use of alcohol. Less than one cubic centimètre of alcohol did either not, or only very slightly, diminish the temperature of dogs and rabbits; two cubic centimètres caused decrease of temperature, and increase of the rate of pulsation. Larger, but not fatal doses, caused a decrease of temperature amounting to from 2° to 4° C. Fatal doses had the same effect. If fever was artificially produced in animals by injection of pus or putrid matter, alcohol always succeeded in reducing the fever heat; but the animals died all the same. The sensation of warmth, which is experienced on taking alcohol, in spite of the temperature of the body becoming actually lower, is by Bouvier explained as owing to local irritation of the mucous membrane, and local increase of temperature in the parts where the alcohol is in direct contact with the mucous membrane.

Schmiedeberg‡ has studied the effects of alcohol on the *heart's action, and on respiration.* His experiments on cats, rabbits, and men have led him to the conclusion that highly diluted alcohol does not produce any deviation from the normal rate of pulsation or respiration in men; while in frogs the frequency of the heart's contractions is diminished after reflex action has ceased, and in rabbits the pulse is accelerated; but this is only in consequence of the manipulations necessary for the experiment. There is no in-

* "Ueber die Pachymeningitis bei dem chronischen Alcoholismus." Königsberg, 1869.

† "Archiv für Physiologie," vol. i. p. 370.

‡ "Untersuchungen über den Einfluss des Alcohols auf die Thätigkeit des Herzens." Dorpat, 1869.

crease of temperature; the pressure of the blood, which is initially somewhat increased by the movements of the animals, sank in the course of the experiment. Section of the pneumogastric, after injection of alcohol into the stomach or into the jugular veins, caused immediate rising of the pressure of the blood, together with accelerations of the pulse. If, after previous section of the vagus, alcohol was injected, the pressure was temporarily diminished without simultaneous retardation of the pulse. Alcohol seems, therefore, to weaken the heart's action, probably by causing irritation of the central ends of the pneumogastric, and by simultaneously exerting a direct influence on the musculo-motor system of the heart.

M. A. Lieben has suggested the following *test for alcohol*:—Put a small quantity of the liquid into a test-tube, with some grains of iodine and a few drops of caustic soda. Heat slightly, without boiling. If alcohol be present, a yellow crystalline precipitate of iodoform is deposited. It is said that the $\frac{1}{2000}$th part of alcohol may be thus detected. Applying this test to the examination of ether, M. Lieben finds that the last traces of alcohol are most easily removed by submitting the ether to an oxydising mixture of bichromate of potash and sulphuric acid, afterwards washing once or twice with water to get rid of the products of the oxidation of the alcohol. M. Lieben has very successfully applied this reaction to the examination of urine after drinking alcoholic liquids.

M. H. Bunte* has *converted urea into carbaminic acid.* He mixed 8 grammes of nitrate of urea with absolute alcohol, and heated the mixture for several hours, at a temperature of 130° C., in a sealed tube. He then dissolved the contents, that were nearly solid, in water, and then, upon heating with ether, he obtained a body having the formula $C_3 H_7 NO_2$.

The quickness with which *hydrocyanic acid* kills, and the minimum dose which will produce death, have been studied by Dr. Preyer.† He experimented on rabbits and guinea-pigs, and found that if inhalation of the strong hydrocyanic acid gas was continued for the space of a second, it killed the guinea-pigs, and if for three seconds, the rabbit. The time from the ingestion of the fatal dose till the last inspiration is, in guinea-pigs, from 5 to 16 seconds, and in rabbits from 15 to 29 seconds; after application of a drop to the eye, 80 seconds, and after putting 7 drops on the tongue, 60 seconds.

* "Annalen der Chemie und Pharmacie." August, 1869.

† Wochenblatt der Wiener ärztl. Gesellschaft, 52.

Injection of 1 cubic centimetre of 60 per cent. hydrocyanic acid into the jugular vein of a rabbit caused convulsions after 29, and death after another 10 seconds. The minimum fatal dose of the anhydrous acid it is not possible to determine with the means at present at our disposal. In the blood of animals killed by inhaling it, the presence of the acid cannot be shown by peroxide of hydrogen, although this will indicate the presence of $\frac{1}{1000}$th of a milligramme. Schönbein's test, which consists of adding copper to a solution of guaiacum containing hydrocyanic acid, is much more sensitive than the peroxide of hydrogen test. Filtering paper, saturated with such a solution, and moistened with 0·25 solution of sulphate of copper, will allow us to ascertain the presence of the acid in tobacco smoke, in the saliva, and in less than one cubic centimetre of genuine kirschwasser and maraschino. Preyer has somewhat modified Schönbein's proceeding, and uses a mixture of highly diluted alcoholic solution of guaiacum, with so little of a highly diluted aqueous solution of sulphate of copper, that the liquid does not become turbid. On bringing the stopper of a bottle containing diluted hydrocyanic acid, within one to two centimetres of the yellow mixture contained in a white porcelain vase, it acquires, within a few seconds, a blue colour, which, on shaking the mixture, becomes uniform. With this test, the blood of rabbits which had inhaled the vapour of 60 per cent. acid for from 3 to 10 seconds, and had died in from 25 to 120 seconds, was examined. Some of the blood was put into a retort containing diluted sulphuric acid, and was then distilled; the copper and guaiacum mixture then became blue in 8 to 10 minutes.

The physiological effects of *carbolic acid* have been investigated by M. Neumann.* He used an aqueous or glycerinic solution of the acid, in frogs, rabbits, and dogs. From 2 to 6 minims of a solution containing 1 part of acid to 6 parts of water, if injected into the lymphatic heart, or the skin of the groin or extremities of frogs, cause paralysis of the hind-legs, first on that side where the injection was made, and afterwards of the fore-legs; muscular twitchings; increase of the secretion of the skin; at first acceleration, and afterwards retardation of respiration and circulation, while muscular contractility and sensibility remain unimpaired until death; hyperæmia of the medulla oblongata; hyperæmia and ecchymosis in the liver. Death ensued after 24 hours, but if the acid was injected into the heart itself, in 2 hours. The first

* "Archiv für Dermatologie und Syphilis, vol. i. p. 224."

symptoms are observed about 5 minutes after administration. In rabbits, 2 drops act in a poisonous manner, and 20 prove fatal in 5 minutes. Injection of 2 drops into the jugular vein kills immediately, of 6 drops subcutaneously, in 2½ hours. Smaller doses, repeatedly given, cause diarrhœa, and death within a few days. Dogs may take from 60 to 80 grains internally in pills, without showing other symptoms than acceleration of respiration, and salivation, but die after 30 grains in solution. *Post mortem* appearances are injection of the cerebral meninges, hyperæmia of the brain and lungs, fatty degeneration of the follicles of the stomach, the liver-cells, and the cells in the canaliculi of the kidney. If subcutaneously injected, the acid may cause suppuration and pyæmia. Fatty degeneration of the liver has, by Bruckmüller, been found in dogs, in which carbolic acid was rubbed in for disease of the skin. In the human subject, according to Neumann, the phenomena vary according to age, sex, constitution, form and time of administration. Larger doses may be borne after meals; children and delicate women are very sensitive to it; the former become irritable, and even delirious, while the latter complain of fulness in the head, weakness in the legs, and profuse perspiration. Concerning fungi, the same observer remarks, that a solution of 1 part of acid in 1,000 of water does not interfere with the germination of fungi; that solutions of carbolate of soda are likewise ineffectual, but that a solution of 1 of carbolic acid in 500 water arrests germination, while 1 in 300 destroys fungi completely. More saturated solutions also destroy mycelium, and cause shrivelling up of gonidium. Neumann used lotions containing carbolic acid in mild forms of lupus, but found the effect rather slow; in syphilitic eruptions, eczema, &c., it was more rapid. Its internal use in syphilis and prurigo was a complete failure; mild cases of psoriasis were cured; but, on the whole, Neumann dislikes the remedy, on account of its being so dangerous.

Muscarine,* the poisonous alkaloid of the fly-mushroom (agaricus muscarius, Linn.), has been carefully examined by Drs. Schmiedeberg and Koppe, of Dorpat. The alkaloid is prepared in the following manner:—The mushrooms are collected in the autumn, and, together with their stems, firmly pressed out; the juice is then inspissated and treated with alcohol; the alcoholic filtrate is evaporated, and the remainder treated with water, acetate of lead, and ammonia,

* Schmiedeberg und Koppe, "Das Muscarin, das giftige Alkaloid des Fliegenpilzes (Agaricus muscarius, Linn.), &c." Leipzig, 1869.

after which muscarine remains in solution. The filtrate is then treated with sulphuric acid, whereby the salines contained in it are changed into sulphates; the liquid is then repeatedly shaken with ether, afterwards treated with baryta, and discoloured with animal charcoal. Muscarine is then precipitated by the addition of iodide of potassium and bismuth, or iodide of potassium and mercury. The crystalline precipitate of the iodide of muscarine and mercury is then suspended in water, the solution rendered alkaline by the addition of baryta, and sulphuretted hydrogen passed through it. The filtrate is treated with sulphate of silver, whereby sulphide of silver, iodide of silver, and sulphate of baryta are precipitated, while muscarine, and the excess of sulphate of silver remain in solution; the latter is then removed by baryta water, and the baryta by carbonic acid. Muscarine crystallises in thin, fine flakes, and is a powerful organic base, closely allied to nicotine. It is essentially a cardiac poison. Small doses retard the pulse considerably, and a somewhat large quantity causes the heart's action to be arrested during diastole; the excitability of the heart is, however, not annihilated, but merely suppressed by an increase of the inhibitory action of the vagus. This is proved by the antagonistic effects of atropine; when muscarine has paralysed the heart, and a dose of atropine is subsequently administered, the heart's action recommences forthwith. The first effect of muscarine poisoning is generally salivation, constriction of the pupil, and spasm of accommodation. Atropine is an absolutely effective antidote, which even saved animals brought into the most desperate condition by previous administration of muscarine.

The question of the notorious immunity enjoyed by the *Styrian arsenic-eaters*, from the otherwise so fatal effects of that poison has been investigated by Dr. Werber,* of Freiburg. He first applied himself to find out why the primary symptom of gastritis, which is the first observed when any quantity of arsenic is taken, should be absent in them. Now he finds, that the Styrians always take the white arsenic in substance, either alone, or with bread or bacon, once or twice a-week, and only at the new and full moon. They generally begin with one-eighth or one-fourth part of a grain, and go on with this dose until they find it no longer sufficient to produce stimulant effects. They then gradually increase it, and it is only years after having first commenced the use of the arsenic that they are able to take quantities varying from three to six grains,

* "Deutsche Klinik," No. 20, 1870.

which, to persons unaccustomed to the mineral, would be a fatal dose. That no gastritis follows, Dr. Werber ascribes to the small initial dose, and the very gradual increase which takes place. The initial dose causes no inflammation, but only irritation, which, if frequently repeated, leads to thickening of the mucous membrane, and more especially of its epithelial layer, whereby the membrane itself is effectually protected from a too profound action of the poison. It is, therefore, not surprising that at last doses are easily borne which would produce gastritis in other persons, just as habitual drunkards may, with a certain amount of impunity, take pure alcohol, which would cauterise the stomach of others. This explanation is corroborated by the fact that the arsenic-eater has, on a too sudden increase of the dose, to pay for his want of caution with an attack of gastritis, just as one who is unaccustomed to the use of the mineral. Poisoning with fatal results has not unfrequently thus been caused even in these hardy mountaineers. The bland diet, taken by the men, has also to be considered, as they live almost entirely upon milk and cheese.

It is well known that most affections of the stomach are caused by an irregular, immoderate, and irritating diet, while, on the other hand, we are aware that in chronic gastritis, and even in ulcer of the stomach, a bland diet, chiefly of milk, is followed by excellent results. Habitually bland diet is, therefore, an important agent for avoiding irritation of the stomach. Remote symptoms of poisoning also threaten the arsenic-eater, and several causes are again at work here for retarding or preventing chronic poisoning. As arsenic is always eaten in substance, and no drink is taken afterwards, a rapid solution of the mineral is prevented. It is an ascertained fact that where arsenic is taken in solution, the local symptoms of gastritis are less marked, and may even be entirely absent, while the constitutional effects of the poison come on more rapidly, and may cause death in a few hours. Probably a portion of the mineral passes through the bowel undissolved, and elimination by the bowel is promoted by the habitual use of purgatives, chiefly aloes, on the part of the arsenic-eaters when they do not take the poison; and the whole quantity which is eaten, therefore, does not take effect in the system. An arsenic-eater would not be able to take a corresponding quantity of Fowler's solution as well as he could the solid white arsenic. Most probably, the pure and fresh mountain air, together with the great amount of exercise taken by these people, further promote elimination, and the circumstance that the habit is transmitted from parent to offspring, renders the latter, no doubt, less sensitive to the action of the poison.

From the researches of M. Köhler,* concerning *elaterium*, it results that the considerable differences of "elaterium," when used as a purgative, are not owing to different ways of preparing the substance, but probably to the variations in the quantity of elaterine, which is found in the expressed juice of Momordica elaterium. It would appear that in July the percentage is 4 to 5, while in August it is only 0·69, and in September there is none whatever left. The following is the best test for elaterine. It is treated with either acids or alkalies, and then extracted by either ether, or amylic alcohol, or sulphide of carbon; it is only partially extracted by chloroform, and even less so by benzine. From the alkaline solution it cannot be extracted by petroleum-ether, but easily so from the acid solution.

Elaterine does not cause any physiological effects, either local or remote, if it is brought into doubly-ligatured folds of intestines from which the contents have been removed, or into the rectum, in powder. Injection of the alcoholic solution into the cellular tissue of the back or abdomen, or into a vein, or introduction into the stomach after previous tying of the ductus choledochus, causes only remote effects, such as ptyalism, loss of consciousness, anæsthesia, tetanus, and dyspnœa, but no vomiting or diarrhœa; *post mortem* appearances are hyperæmia of the lungs, but no enteritis; and a local effect only results when elaterine comes in contact with bile in the intestines.

Professor Valentin,† of Berne, has made a number of experiments on *woorara*, with special regard to the excitability of the nerves and muscles. He used six different kinds of woorara, viz., one from Venezuela, four from Cayenne, and one of unknown origin; also the liquid juice of antiaris toxicaria, the inspissated extract of the same, resin of a poisoned arrow from Java, antiarine, arrow-poisons of the savages of Para, the Bushmen, and Basutos, and a white crystalline substance of an arrow-poison from Soudan. The effects observed appeared different, according as either nerve or muscle was acted upon, and the continuous or induced current was used. If a continuous current was sent through the muscular tissue itself, there was no instantaneous contraction on closing the circuit, but the contraction was continuous while the circuit remained closed, and remained so during the progress of the intoxication, for four to six hours; after which it gradually diminished,

* "Repert. für Pharmacie," vol. xviii. p. 596.

† "Archiv für die Physiologie," vol. i. and ii.

and then disappeared. If an induced current was applied, there was only slight effect on the nerves, and a great deal more on the muscles, as shown by Pflüger's myographion, in ten or fifteen minutes after the poison had been administered. Later on the induced current lost all effect, while the continuous current still proved effective, especially when voltaic alternatives were used. The spinal cord lost its excitability previous to the peripheral nerves. The arrow-poison of Para is stronger than woorara, and rapidly destroys the vital properties of nerves and muscles.

Dr. Kemmerich,* has investigated the nutritive value of Liebig's meat-extract. He took two young and vigorous dogs of the same weight, and kept them under exactly similar conditions, the only difference made being, that to the food of the one the salines contained in the meat-extract were added, while the other merely received table-salt in addition. The food used was a sort of tea, made of lean horse-flesh, containing chiefly albuminates. After the dogs had been observed for some time, it was found that, although the horse-tea given had been exactly the same, the dog who received the salines of the extract in addition, grew much better than the one who had merely table-salt added to his food; within a few weeks the former was strong, jolly, and intelligent, while the other was feeble, indifferent and morose. Towards the end of the sixth week, this unfortunate animal was so feeble that it could neither walk nor stand. At last it refused food, and would have died if something had not been done for it. In order to make certainty doubly sure, Dr. Kemmerich then reversed the experiment, so that the beast which was at death's door now received the saline of the extract, in addition to the "soupe de cheval." After a fortnight the dog had quite recovered, and after another month he was heavier than his rival. When the two dogs were at last killed, it appeared that the increase of body-weight was not owing to formation of fatty matter, but to better formation of blood, bones, and more especially of muscular tissue.

Liebig has laid stress upon the importance of not having any glue in the genuine meat-extract. Glue (which is very cheap) he considers as the true enemy of the real meat-extract, just as fat or albumen, and he fears that the adulteration practised with these substances in spurious compounds will considerably injure the reputation of the extract, as diappointment is sure to be caused by the former. One of these compounds, which comes from Russia,

* "Deutsche Klinik," No. 25.

and is now largely sold all over the Continent, has the following chemical composition compared with Liebig's preparation.

	Russian Meat-extract.	Liebig's Meat-extract.
Water evaporating at 110° C. .	15·13	16·0
Salines	4·75	18 to 20
Fat.	0·22	0
Nitrogen	10·57	9·51
Matters soluble in 80 % alcohol	38·09	81·5

It appears from this analysis that Liebig's preparation contains much more of salines and extractive matters than the Russian compound, nearly one-half of which is glue, which has no value whatever; moreover, the chief constituent of the salines in this preparation is table-salt, while Liebig's preparation contains chiefly potash, which is of far more importance in a nutritive point of view.

The favourable effects of meat-extract are chiefly dependent upon the dose in which it is given. All unpleasant symptoms which have been observed after its use are owing to an overdose having been taken. The proper quantity for a breakfastcupful of beef-tea is 2·5 grammes (about 37 grains); 5 grammes, which is about a tea-spoonful, is the proper daily dose for an adult, while children and sick people should take proportionally less. Taken in such doses, the extract increases the power of the heart, and improves circulation, like coffee, tea, and alcohol; but it is preferable to these, on account of its being nourishing as well as stimulating. Animal heat is hardly at all influenced by it, the variations observed after its use amounting only to a few decimals.

As far as its therapeutical influence is concerned, Dr. Kemmerich thinks it applicable chiefly in chronic catarrh of the air-passages and digestive organs, where there is secretion of tough mucus; the secretion is fluidified, and its expectoration facilitated. In such cases it seems to act chiefly by the salines it contains, while in chlorosis it proves useful by its iron, which, although small in amount, yet is in excellent condition for absorption. It is likewise strongly to be recommended during convalescence from acute dis-

eases, where, under its influence, a great increase of the body-weight takes place.

M. Steinauer* prepares hydrate of bromal by passing a current of carbonic acid, saturated with vapours of bromine, into alcohol. The hydrate of bromal, thus obtained in large crystals, was purified by recrystallisation.

Hygiene.

The question whether *consumptive persons should by their medical advisers be allowed to marry*, or cautioned against the matrimonial state, has lately been much discussed, and a great variety of opinions have been expressed on it. Dr. Hartsen,† a German physician, while allowing that phthisis is often transmitted to the offspring of a tuberculous parent, thinks that a warm attachment and a happy union are favourable to health, and may, therefore, contribute to the cure of the patient; while unsatisfactory sexual relations may accelerate the fatal issue of the complaint. Children, who know that they come from a tuberculous stock, might regulate their lives so as to avoid the breaking out of the disease; moreover, the therapeutics of consumption are constantly advancing, so that our children, even if they should become tuberculous, would have a better chance of being cured than ourselves or our fathers had. Dr. Hartsen ridicules the idea that sexual intercourse is directly hurtful to sick people, and especially to the consumptive, and thinks that a moderate practice of coition does good. Professor Virchow, however, who has published Dr. Hartsen's views in his "Archives," declares himself a decided opponent of the same, and lays stress upon the fact that the disease under consideration is often attended with a morbid increase of the sexual desire. Passion frequently outruns reason, and even medical men, who ought to know better, are not protected against it. As far as the patient himself is concerned, it appears that tubercle in the testis, vas deferens, and prostate, is chiefly developed in the first few years after the sexual instinct has been indulged in. Professor Virchow has seen several cases where consumptives, who had been abstainers before marriage, were, after having been married, rapidly attacked by tubercle in the prostate gland. A similar thing occurs in women, where not unfrequently tubercular endometritis results from the puerperal process, and is

* "Berichte der deutschen chemischen Gesellschaft zu Berlin." Nov. 18, 1869.

† "Virchow's Archiv," vol. xlix. p. 337.

often complicated with tubercular peritonitis. It is, however, not merely the local development of tubercle in the organs of generation which is to be feared as a consequence of the indulgence of the sexual passion after marriage, but likewise a greater activity of the systemic disease. It used to be said that pregnancy and parturition had a tendency to check the progress of phthisis; but Grisolle and Dubreuil have shown that just the contrary is the case. Nursing infants will often rapidly develop latent phthisis. With regard to Dr. Hartsen's ideas about the ease with which the sexual appetite may be restrained, Professor Virchow is not inclined to attach any practical importance to it, as he has frequently seen husbands die of consumption just within the first few years of their married life. As far as the children of consumptive parents are concerned, Professor Virchow concedes that the complaint is not invariably transmitted to them; yet they are almost always delicate, and, if they keep clear from phthisis themselves, they may transmit the germ, or the predisposing influence of it, to their offspring. With regard to therapeutics, the Professor does not believe that we shall ever come to cure real tubercular phthisis, and advises medical men to warn consumptives strongly against marriage, just as he would persons in whom there is an hereditary tendency to insanity.

M. Siegel* has found fungi in a specimen of *milk*, which he examined on account of its having a blue colour. The colour was of a light blue, the taste feebly acidulous, and the reaction acid. The microscope showed numerous spores and threads of fungi. Siegel thinks that such fungi change the caseine of the milk into aniline, and therefore render the milk poisonous. The sanitary condition of the cows from which the milk had been taken could unfortunately not be ascertained.

M. Herzfelder† describes a kind of food which is very popular amongst the Chinese, and goes by the name of *Tao-foo*. It is prepared from beans, which are rubbed small, and to which water, and a little plaster of Paris is added, whereby a paste is produced which looks like coagulated milk. The paste is cut into pieces of four or five inches square, and one inch thick, and is boiled with water to make a soup, or added as stock to other soups. It is also eaten with sugar, as a cake; it is cheap, nutritious, and highly popular amongst the Chinese working classes.

* "Würtemberg. medicin. Correspondenzblatt," No. 36.

† "Wochenblatt der Gesellschaft Wiener Aerzte," No. 43.

Dr. Müller,* of Berlin, strongly recommends his *glycerinic vaccine matter*, in place of the ordinary vaccine lymph. It is prepared in the following manner:—One part of glycerine is mixed with one part of water, and five parts of this mixture are added to one part of lymph taken from a child. It is necessary to preserve the glycerine vaccine matter in the dark, but it may be kept in a warm place. It may be also prepared by adding glycerine and water to dried lymph. The efficacy of the mixture seems to be greater than that of ordinary lymph, as it does not dry so quickly, and because the glycerine prevents the coagulation of the blood in the vaccinal scarifications. Glycerine lymph keeps well for years. Dr. Müller has sent it to the tropics, where it has proved equally effective as in Europe, and he lays chief stress upon the increased quantity of vaccine matter thus obtained as an advantage of his process.

Professor Virchow† has been requested by the Prussian Government to state his ideas on those influences prevailing in schools, which may be considered disadvantageous to health. The heads of *school pathology* are, according to him:—1. Impaired sight, chiefly short-sightedness. 2. Congestion of the head, originating in long-continued sitting on forms, incomplete respiration, and simultaneous intense mental exertion; headache, epistaxis, and struma being the consequence. 3. Curvature of the spine; scoliosis being a disease of the school-period of life, although it is doubtful whether school-life is the principal agent in originating curvature; anyhow, it is very important to counteract the tendency to curvature by a judicious attitude, and gymnastic exercises. 4. Pulmonary consumption is certainly in young persons often caused by circumstances independent of school-life, but the school may, by bad air, cold, dust, and impaired respiration during long-continued sitting, essentially contribute to its development. 5. Dyspepsia, and irritability of the genital organs are consequent upon the disturbance of abdominal circulation from long-continued sitting. Professor Virchow adds that school pathology is still in its infancy, and recommends statistics of school diseases to be drawn up, and superintendence of the public hygiene of schools by competent medical men. A central committee, consisting of doctors and schoolmasters, ought to be formed to report on these matters. The same questions have been treated by Varrentrapp,‡ Herz,§

* "Vierteljahrsschrift für gerichtliche Medicin," vol. xi. p. 140.

† Ueber gewisse die Gesundheit benachtheiligende Einflüsse der Schulen. Berlin, 1869.

‡ "Deutsche Vierteljahrsschrift für öffentl. Gesundheitspflege," vol. i. p. 465.

§ "Blätter für Reform des Sanitätswesens," No. 6.

Schildbach,* and others. The ordinary school-form is condemned by all observers.

The dangers of *circumcision*, as practised by Mosaic law, have been dwelt upon by Dr. Ebstein,† who reports a case in which diphtheritic poisoning of the wound occurred eight days after circumcision, and the life of the child was placed in great danger, although it ultimately recovered.

Military Hygiene.

The most important work which has appeared on this subject is that of Dr. Löffler,‡ of which we can review only the second volume, the first having appeared two years ago. The sanitary service of the Prussian army was completely revolutionised in 1869, in consequence of attention having been drawn to the defects previously existing in it by the experience of the Danish war in 1864, and of the Austrian campaign in 1866. Some improvements had already been made in 1863; for instance, surgeons had been put at the head of military hospitals instead of officers. Yet in 1866 numerous occasions occurred in which the system worked badly; and a committee was formed in 1867, by order of the government, which worked for two years, and whose recommendations were finally adopted in 1869.

The whole army medical service forms a department of the ministry of war, which is under the immediate superintendence of the minister of war himself. The sanitary officers of the army form a special corps, the same as the engineers, and the medical officers have the rank and position of officers. In the mobile formations, a distinction is made between the sanitary persons belonging to the regiment, and the persons belonging to special sanitary bodies. The infantry battalion has 1 full surgeon, and 1 assistant surgeon; the cavalry regiment has 1 full surgeon, and 2 assistant surgeons; the mobile field artillery regiment has 1 surgeon in chief, four full surgeons, and sixteen assistant surgeons; each company of sappers, pontooniers, and miners, and each pontoon column, has an assistant surgeon; the train-battalion has 2 assistant surgeons. The *reserve force* of the lazareths consists of 3 staff surgeons, 9 assistant surgeons, 5 field apothecaries,

* "Die Schulbankfrage und die Kunze'sche Schulbank." Leipzig, 1869.

† "Archiv für Heilkunde," vol. x. p. 393.

‡ "Das preussische Militär-Sanitätswesen, und seine Reform nach der Kriegführung von 1866." Berlin, 1869, vol. ii.

3 lazareth inspectors, 3 treasurers, 3 non-commissioned officers acting as secretaries, 27 dressers, 36 male nurses, 3 cooks, and 17 train soldiers for the surgeons and officers, for each army corps; the whole of this body is placed under the command of the General-Etappen-Inspection. The field-lazareth service consisted previously of light and heavy field-lazareths, the former of which had to follow the army in the field, and to do the transport of the wounded, while the latter were more stationary institutions; this, however, has been completely changed, inasmuch as the transport service has been entirely separated from the lazareth service.

The transport service and the management of the places for dressing is assigned to the *sanitary detachments*, of which there are three to each army corps. Each consists of 1 rittmeister, 2 lieutenants, 1 treasurer, 1 serjeant-major, 12 serjeants, 12 other non-commissioned officers, 124 sick-bearers (inclusive of 4 musicians) 2 staff surgeons, 5 assistant surgeons, 1 field apothecary, 8 dressers, 8 male nurses, 6 train non-commissioned officers on horseback, and 23 train soldiers; that is altogether 206 men. The means of transport are—30 ordinary litters, 3 litters on wheels, and 6 carriages. Any number of the latter may, if necessary, be added, by "requiring" peasants' carts. For transporting instruments, etc., there are two sanitary carriages, and there are two luggage vans, so that there are altogether 10 two-horse carriages with 22 train-horses, and 19 saddle-horses for officers and surgeons.

There is at present only one form of field lazareth, 12 such being allowed to each army corps, and able to receive 2,400 patients. Every lazareth consists of 1 surgeon-in-chief, 1 staff surgeon, 3 assistant surgeons, 1 field apothecary, 1 lazareth inspector, 1 treasurer, 9 dressers, 12 male nurses, 1 cook, 1 apothecaries' assistant, 1 police serjeant, 1 non-commissioned officer acting as secretary, 1 non-commissioned officer acting as captain-at-arms, 5 train non-commissioned officers on horseback, and 15 train soldiers, that is altogether 54 persons. In this way there is 1 surgeon to 33 patients, 1 dresser to 25, and 1 nurse to 16. In the Austrian army there is only 1 surgeon to 70, 1 dresser to 55, but 1 nurse to 5 patients. The washerwomen have been replaced by cooks. The surgeon-in-chief is in command of the whole lazareth; he has power of disciplinary punishment over the persons technically under him, while the train-soldiers and the patients in the lazareth are under the disciplinary command of the divisional general, to whose division it is attached, or the General-Etappen-Inspection. Instruments, bandages, and drugs are transported in two sanitary two-horse carriages, the other necessary utensils being carried in

2 four-horse carriages. Each field-lazareth has 5 carriages, 16 draught-horses, and 14 saddle-horses. Each division has 2 field lazareths, and each army corps 6 reserve field-lazareths.

The aid to the wounded during the battle is assigned to the surgeons of the troops and the sanitary detachments. One-half of the regimental surgeons with their assistants, accompany the troops under fire, while the other half is concentrated, at some distance from the field of battle, in the so-called "first-dressing-places." Each company, squadron and battery, sends 4 sick-bearers, who must carry the Geneva badge. Each battalion has 2 litters weighing 28 pounds; each lazareth-assistant and sick-bearer carries field-flasks. Each soldier carries a small packet of bandages; the lazareth soldiers have also some in their pockets, and every surgeon has a bearer with a dressing valise attached to himself. The action in the first-dressing-places is only intended to prepare the transport of the wounded into the lazareths. Every wounded soldier receives a small breastplate, on which the diagnosis, the degree of transportability, the nature of the wound, and the assistance already given, with the signature of the surgeon, is inscribed.

The setting up and serving of the "chief-dressing-places" is the duty of the sanitary detachments. It is from these places that the sick-bearers proceed forwards. Special instructions regulate the action of the surgeons. The place itself is fixed upon by the divisional command, or the divisional surgeon, who carries the Geneva badge, the whole service being under the superintendence of the eldest surgeon present. The servants are divided into three departments, the first of which receives the wounded, lays bare the wounds, makes simple dressings and minor operations; the second department makes complicated dressings, and the third major operations, from which resections are excluded. The seven surgeons of the sanitary detachment are, in case of need, and if possible, reinforced by surgeons of the "first-dressing-places" and the field lazareths, according to orders of the divisional surgeon. In case of retreat, the eldest surgeon present in the dressing-place determines which of the surgeons and assistants are to remain; the other persons being under the orders of the commander of the sanitary detachment.

The divisional surgeon determines and orders the removal of the chief-dressing-place. The worst cases are given over to the field lazareth. Further displacements are ordered by the General-Etappen-Inspection. In order to ascertain the identity of the killed, every soldier wears a mark of recognition.

The medical service in the rear of the operating army is proxi-

mately assigned to the field lazareths established on the field of battle, which are, by the General-Etappen-Inspection, changed as soon as possible into permanent military lazareths, in order to be able to follow the operating army. In the rear of the base of operations are the reserve lazareths, and the whole system is intended to effect as far as possible a complete dispersion of the sick. The chief command rests with the General-Etappen-Inspection, the Etappen-General-Surgeon having to regulate the movement of the sick. This authority puts up "Etappen-commands" at appropriate distances, sees to "railway-Etappen," and the transport altogether. The directors of the field lazareth are the go-betweens of the temporary and reserve lazareths. The lazareth reserve depots and the lazareth reserve persons are likewise under the command of the General-Etappen-Inspection. The principle on which the patients are distributed, is invariably that of dispersion. To aid this purpose, an improvement has been made in the means of transport, especially by rail. The system which has been chosen is Grund's, pressure springs being placed on the bottom of the carriage, and the litters being put on these springs. The mode in which the lazareths are evacuated has been strictly put under regulation, the Etappen-Command being the authority which provides for sending the patients from the war lazareths into the reserve lazareths. The latter are selected during times of peace, special regard being had to places where there are good means of communications, either by water or rail, where there are numbers of good medical men, or where there are garrison lazareths, or civil hospitals. Added to them are the union reserve lazareths, which have a minimum of twenty beds.

The sanitary material is likewise provided according to regulation. Certain kinds of food and alcohol are carried in the sanitary carriages; there are plenty of surgical instruments, while the pharmaceutical preparations have been considerably reduced in number.

The following are the conditions required for the lazareths:— The buildings should not be very large, as there should be plenty of cubic space; each lazareth building ought to be submitted for inspection to the General-Staff-Surgeon; for smaller lazareths the corridor system, for the larger ones the pavilion system is to be preferred; the minimum per head should be 1,200 cubic feet; for small wards the ceilings and walls should be painted; natural ventilation by open fire-places is preferable to artificial ventilation; gas should be used with funnels for carrying off the bad air; water-closets or d'Arcet's closets, should be used instead of cesspools;

for temporary barracks the American pattern is the best; barrack-tents, sick and insulating tents, should be used extensively; and permanent barracks and schools only be used for war—and reserve lazareths in cases of emergency. Dr. Löffler's work contains, as an appendix, the order of Prince Frederick Charles on the sanitary service in the first army; the general orders concerning the sanitary corps; the regulations on the reception of candidates into the school of military surgery; the Geneva Convention; tables showing the numbers of wounded, lazareth patients, and invalided in the Austrian campaign of 1866, and a complete medical "ordre de bataille" of that war. No one who is interested in the numerous questions of military hygiene should fail to procure Dr. Löffler's work, which must for some time to come be the standard work on this subject.

Diagnosis.

Chyluria is a rare disease, and a case of it having lately occurred under the care of Professor Niemeyer, of Tübingen, Dr. Eggel* has given a complete record of the same with epicritic remarks. The patient was a lady, aged 57, a native of Rio Grande del Norte, in the Brazils, and had been quite well during childhood. She first menstruated at 13, and married at 15 years of age. She had three children, and her confinements had been perfectly satisfactory. When she was 30 she began to suffer from pain and fulness in the head, and occasional attacks of giddiness. She left the Brazils when 44 years old, and lived since in various parts of Europe. Eight years ago, when in Florence, she first perceived a milky colouration of the urine, which formed a strongly gelatinous sediment, gelatinous masses being voided with the urine, which gave pain. The quantity of urine was not changed. The patient thought it had come on in consequence of a railway accident which had given her a great shock. The urine remained milky for about eight months, the patient getting more feeble all the time, but hardly losing flesh. She became at last so weak that her life appeared in danger, and she was ordered change of air to a mountainous district in Piedmont. After having been there for a fortnight, the urine became quite normal, and the patient rapidly recovered her strength.

For about a twelvemonth the urine remained in good condition, but then, without any appreciable cause, it again became turbid, the patient being then in Paris. The general health was, however, not affected this time, and the peculiar colouration of the urine

* "Deutsche Archiv," vol. iv., p. 421.

was not permanent, but came on at intervals, and had the same degree of intensity as before. This state of things continued for some months, and then the urine again became normal for a period of two years.

The disease appeared a third time, when the patient was in London, and continued for two years, during which time, however, it was occasionally normal for a few weeks. The general health was not affected. The patient then remained free for fifteen months, after which the fourth attack of her illness occurred, and it was then that she came under the care of Professor Niemeyer. The attacks of headache and giddiness, to which the patient was subject, appeared to have no connexion with the state of the urine. The patient had visited several spas, such as Kissingen, Spa, &c., but had not derived the least benefit from the use of the waters.

The urine appeared exactly like milk, that is, as a non-transparent white liquid, with all the characters of a true emulsion. The colour had a slight shade of reddish-yellow. The odour was not urinous, but either flat or, when it was not quite fresh, like that of sulphuretted hydrogen. No solids were contained in the urine. On standing for several days it kept its milky quality throughout, no differences being perceptible in the test-tube between the upper and lower strata of the liquid; but after twenty-four hours there was a sort of cream of intensely white colour at the surface of the liquid, while at the bottom a white granular sediment became perceptible. On heating an alkaline and putrid quantity of the urine no change occurred in it; but on adding a few drops of acetic acid, and heating it, a flocculent mass was observed, which took the shape of a large lump of spongy consistence, and shrank rapidly, while the liquid which had before been milky white became of the colour of whey. A fresh sample of the urine, which was acid, coagulated on heating it without the addition of acid, and after the sediments had been filtered off, the filtrate gave, on the addition of acetic acid, a second flocculent deposit, which proved the presence of two albuminates. The urine was much more liable to decomposition than normal urine. For the purpose of microscopical examination the fresh urine was left standing in a glass with a pointed bottom, after which drops were withdrawn from different layers of the liquid by means of a pipette. The upper and middle strata of the liquid contained no fat globules or milk corpuscles, but only an enormous mass of fine molecules, which were moving about rapidly, and a moderate number of vibriones. The drops taken from the bottom of the vessel contained the same formations, but also a very few cells,

which resembled red blood-corpuscles as far as size, colour, and refractory power were concerned; some few cells which looked exactly like white blood-corpuscles; and round cells, which were rather smaller than the latter, with considerable refracting power and dark outline, containing a few shining molecules. There are also a few epithelial cells, but no exudation cylinders.

The specific gravity of the urine was from 1010 to 1014. When the urine was shaken with ether, this latter, after separating from the urine, had assumed an intensely yellow colouration, while the urine had nearly lost its milky appearance. The ether was now taken out of the vessel, and the urine was again shaken with fresh ether, until nothing further was taken up from the urine by the ether. All the ether that had been used was then evaporated, when yellow masses of clearly crystalline configuration were formed, which were dried at a temperature of 70° C., and cooled over sulphuric acid. The weight of this mass was 2·68 grammes from 390 cubic centimetres of urine. This might have been free or neutral fat, lecithine, and cholesterine. It was boiled for several hours with a large quantity of aqua barytæ, whereby the fatty acids and neutral fats were changed into baryta soap, while lecithine, if present, must have been decomposed into glycerinic phosphate of baryta, neurine, and stearate of baryta, and cholesterine would remain unchanged. As all these substances, with the exception of neurine and glycerinic phosphate of baryta, are insoluble in water, these two latter could be separated from the other substances by filtering. The excess of baryta was then eliminated from the filtrate by passing a current of carbonic acid through it, and then filtering again; it was afterwards evaporated to dryness in the water-bath, and then treated with absolute alcohol, which will dissolve neurine, but not the glycerinic phosphate of baryta. In order to show the presence of neurine in the alcoholic extract, this was treated with alcoholic solution of perchloride of platinum; this gave a yellow deposit, forming the double salt of neurine and perchloride of platinum, which, after filtration and solution in water, was obtained in crystals, after the water had been evaporated over sulphuric acid. In order to show the presence of glycerinic phosphoric acid in the remaining mass, which had not been dissolved in alcohol, this was heated, the ash dissolved in nitric acid, and the solution treated with molybdanate of ammonia. A yellow deposit was then formed, which was dissolved in ammonia, and when treated with chloride of ammonium and sulphate of magnesia, gave crystals of phosphate of ammonia and magnesia on cooling. A quantitative determination of the

neurine and glycerinic phosphoric acid was not possible, considering the small quantity of these substances. What remained on the filter of the substances boiled with baryta consisted chiefly of an amorphous body of soapy consisteney, which, when shaken with water, foamed considerably. In order to find out whether there was cholesterine mixed with the baryta soaps, the mass was treated with ether in which cholesterine is soluble, but baryta soap insoluble, and the ethereal extract was then evaporated. A crystalline mass was deposited, which however was not quantitatively determined.

The ethereal extract of the urine therefore contained chiefly fatty acids, and also cholesterine and lecithine, or products of decomposition of that body.

That portion of the urine which remained after the ethereal extract had been separated, was then tested for albumen. One hundred cubic centimetres of this were boiled and treated with diluted acetic acid; the coagulum that was formed was filtered off, and carefully washed with water and alcohol, after which it was dried in the air bath, cooled between two watch glasses over sulphuric acid, weighed, burnt, and the weight of the ash determined. The albumen and ash were found to weigh 0·665 grammes, the ash 0·038, the albumen therefore being 0·627. The degree of temperature necessary for coagulation was determined by heating the liquid over the water bath, when it was seen to become turbid at 65° C., and coagulated at 74°, that is, the same as occurs in ordinary albuminous urine. But as it was suspected that the urine might contain not only the ordinary albumen, but other albuminates, a portion was carefully neutralised with carbonate of soda, and then further examined, so that a portion of the liquid was highly diluted with water. This became distinctly turbid, but cleared again on adding salt water. Another portion was treated with chloride of sodium by suspending a crystal of rock-salt in it; after a few hours a deposit was formed, which disappeared on adding a little water. It was therefore proved that the urine contained a fibrino-plastic or fibrinogenous substance.

The urine did not contain any sugar; the quantity of urea in 100 cubic centimetres was 2·10 grammes, and of uric acid 0·03 grammes; of chloride of sodium 0·35 grammes. The specimen analysed therefore contained in 100 cubic centimetres 0·627 grammes of albumen, 0·687 grammes of fat and cholesterine, 2·10 grammes of urea, 0·03 grammes of uric acid, and 0·35 grammes of chloride of sodium.

The analysis of another specimen of the same urine gave 0·32

grammes of albumen, 0·20 grammes of fat and cholesterine, 2·20 grammes of urea, and 0·35 grammes of chloride of sodium. Although the urine smelt strongly of sulphuretted hydrogen, this substance was not present in it.

Professor Niemeyer looked upon the case as one of that disease which has been described as chyluria, galacturia, diabetes lymphaticus, or lymphorrhagia renalis. Dr. Eggel enters fully into the pathology of the case, comparing its symptoms with those observed in other cases of the same complaint, which have been described by Ackermann, Prout, Golding Bird, Bence Jones, Priestley, Carter, Waters, Begbie, Dutt, Rayer, and Chapotin, Caffe, Orfila, and Cavenne. With regard to the pathology of the disease he has arrived at the following conclusions:—

1. The fat of chylous urine does not come from the tissues of the body, but from insufficiently digested food, there being a chylous dyscrasia, which is only rarely observed in Europe, but more frequently in the tropics, owing probably to depression of assimilation by the high temperature of the atmosphere.

2. With the chylous diathesis, and, perhaps, in consequence of it, co-exists atrophy of the renal capillaries, which facilitates the transudation of fat and albumen into the urine.

3. Chyluria and essential hæmaturia are symptoms of the same distemper, which is most intense in degree during childhood, diminished in adult life, and disappears spontaneously in the aged.

4. It is not settled whether in essential hæmaturia the blood and the urine are likewise chylous.

Materia Medica and Therapeutics.

On *chloral*, hundreds of papers have been written, most of which contain little more than a corroboration of the views originally advanced by Liebreich. Dr. Clemens,* of Frankfort, the knight-errant of modern medicine, has boldly laid claim to the discovery of the properties of chloral before Liebreich, by referring to a paper of his, published thirty years ago, in which chloral is mentioned as a disagreeable substance concerning which we know nothing; but has failed to do more than raise a laugh at his pretensions. M. Jastrowitz† has given the remedy largely in insane patients, the dose varying from 15 to 120 grains. He says that, while the patients seemed at first to like the mixture, they, after a

* "Deutsche Klinik.," No. 27, 1870.

† "Berliner klinische Wochenschrift," No. 39.

time, felt an irresistible repugnance against it, so that it was found necessary to administer it by means of a tube. It was in a few cases given by the nose, but this plan had to be discontinued, as in one case strong coryza, and in another suppurations, took place in consequence. It was given in a decoction of marshmallow with liquorice. A few sensitive persons complained of fulness in the head, and others vomited, but only when they had bolted the drug hastily. The original somniferous dose of 60 to 65 grains did not refuse service, even after having been used for weeks, and proved infinitely more certain than morphine and chloroform. Badly nourished patients were in an extremely heavy sleep five minutes after taking 60 grains; habitual tipplers, or drunkards and maniacs required a larger dose than patients suffering from paralysis and melancholia. There was no sedative action produced, either by large or small doses; on the contrary, the latter proved exciting. The pupil was constricted, the face reddened, and a sensation of heat was experienced under these circumstances. In two women, roseola, which rapidly disappeared, was observed. The constriction of the pupil remained permanent when chloral was given for any length of time. Large doses of 90 to 120 grains relaxed the muscles to a high degree; pricking or pinching was then no longer perceived, and even the cornea had lost its sensibility. Respiration became deep, and its rate slightly retarded; the pulse, which occasionally was at first more frequent, sank in the progress of narcosis, and became normal towards the end of it; in one patient, after 75 grains, it became very small and slow. The temperature fell by a few decimals and only in one case by as much as 2° C.

In ten cases of delirium tremens it answered uncommonly well; the best dose for these apparently being 75 to 90 grains, repeated, after a few hours. Liebreich's maximum dose is 120 grains, but in one of Jastrowitz's patients this produced considerable dyspnœa, and temporary cessation of respiration, with cyanosis. Two excited melancholics became worse after chloral, while in one case of the same kind, but of more recent standing, a cure was effected by it in a month. In maniacal excitement no good was produced, except when morphine was combined with chloral.

Dr. Drasche of Vienna, has also largely used the drug in hospital practice. He has seen a stage of excitement after 30 grains, but even more so after 75. If injected into the rectum, the effect was just the same, but some burning pain and tenesmus was caused by it. In some cases of lumbago and cardialgia it relieved the pain.

Dr. Liebreich * has communicated the results of his experiments with a new anæsthetic—*ethyl-chloride*—derived during the preparation of chloral. It is a colourless liquid, boiling at 162° C., heavier than water, of an agreeable smell, and evaporating in the air. He narcotised with this drug twelve persons by inhalations, and found, after a short stage of excitability, complete anæsthesia, during which period the pupils were enlarged. The patients recovered soon after the removal of the inhaling apparatus.

On Liquor Chlori in Cholera and other Miasmatic Diseases.—Dr. Dyes,† of Hildesheim, strongly recommends the liquor chlori as a special antidote to the poisons of most miasmatic diseases, such as diphtheria, dysentery, typhoid fever, cholera, and small-pox. He asserts that if the remedy is given in the premonitory or the first stage of these diseases, where the poison has not yet had time to exert its influence fully on the system, these complaints are cut short as if by magic; while if given in the second or third stage, it may considerably lessen the danger to life. Seeing that in most of these diseases the premonitory or initial symptoms are pricking in the tip of the tongue, dryness of the tongue, sickness, retching, and rigors, Dr. Dyes concludes that the poisons enter the system by the alimentary canal. He finds that gargling with liquor chlori diluted with the same quantity of water, at once removes all these symptoms; but recommends, by way of precaution, in addition to the gargling, to swallow a few doses, in order to neutralise any small quantities of the poison which might have already reached the stomach. Dr. Dyes has seen persons who have been struck to the ground from choleraic infection, get up in five or ten minutes after liquor chlori had been given, and declare that they felt quite well again. When the poison has had time to get into the intestines, and been from there carried into the blood, it is no longer possible to cut short the disease.

Dr. Lorinser, of Vienna, has made some experiments with the tincture of the *eucalyptus globulus* (a plant of the natural order of Myrtaceæ). The results of his observations made with the tincture in fifty-three cases of intermittent fever are in favour of the antiperiodic effects of this new remedy. In eleven cases quinine had been used without effect, and of these nine were cured by the eucalyptus.

* "Allgemeine Medizinische Centralzeitung," May 21st, 1870.

† "Deutsche Klinik," June, 1870.

The Management and Treatment of Disease.

One of the most interesting additions to the local therapeutics of disease is undoubtedly the treatment of certain affections of the stomach by the stomach-pump, as first practised by Professor Kussmaul,* of Freiburg, a gentleman who is already favourably known to the profession by his researches on the pathology of epilepsy. He recommends this proceeding more especially in dilatation of the stomach owing to stenosis of its pyloric end, a complaint attended with terrible sufferings to the patient, and one in which other modes of treatment are almost always unavailing.

The first case in which he used it was that of a country girl, aged twenty-seven, who had suffered from a severe form of dyspepsia ever since she was eleven years old, and who had, before she was admitted into Professor Kussmaul's clinique, became so exhausted by incessant pain, and vomiting of a sour acrid liquid, that her life was despaired of. She was first treated by iodine, alkalies, and occasional doses of morphine, under the use of which she slightly improved; but the improvement did not continue, and the retching and vomiting became so distressing that the idea of evacuating the stomach by means of the pump presented itself to the Professor's mind. He thought that by removing mechanically the large masses of decomposed contents, the heartburn and retching would probably cease at once; that there would be no difficulty in introducing the tube, because dilatation of the stomach is generally associated with dilatation of the œsophagus; that the artificial evacuation of the stomach by means of the pump could not be more painful than the condition of the patient before or during the vomiting; and that, at any rate, it would relieve her more quickly and more completely than the vomiting, which was protracted over a considerable time. It had been generally found that, even after the patient had brought up large masses from the stomach, the organ was not nearly empty; while, of course, by the aid of the pump there would be no difficulty to drain it completely, whereby it might, perhaps, be rendered capable of again contracting to its proper bulk, unless its elastic and contractile power were indeed utterly gone.

In the case just alluded to, the dilatation was due to stenosis of the pylorus, from contraction after the healing of an ulcer. The Professor had often been struck, at the *post-mortem* examination of cases of this kind which had ended fatally, by the circumstance that, although during life there had been symptoms of complete

* "Deutsches Archiv.," vol. vi. part 1.

occlusion of the pylorus, yet it had been possible to reach the duodenum from the stomach by means of the little finger; and he had therefore concluded that the excessive distension and filling of the stomach had mechanically caused complete occlusion of the stenosed pylorus during life. Finally, he thought that, by the use of the pump, a more effective topical treatment of the diseased mucous membrane of the stomach would be rendered possible. This membrane was now constantly irrigated and irritated by acrid and sour matters, which might be thoroughly removed by the pump, after which the membrane might be washed and cleansed with Vichy water, for improving its condition. Professor Kussmaul used what he calls the "American," or "Wyman's" pump, but which is a copy of one originally constructed by Weiss, of London. The instrument was easily introduced in the case alluded to, and six pints of a dirty grey and acrid fluid, containing sarcine and badly-digested particles of food, were evacuated. Great relief was felt; the operation had to be repeated occasionally for about four months, after which the patient was perfectly well, and had increased twenty-two pounds in body-weight. This patient has continued under observation, and remained quite well ever since. One of the most striking effects of the use of the pump was the rapid regulation of the action of the bowels, which had before been most obstinately costive.

The Professor thinks that the pump may be useful not only in cases where the pylorus or the duodenum are stenosed, but also where dilatation of the stomach occurs in consequence of mere atony of the muscular coat of the organ, and consequent loss of elasticity, as in polyphagia, or convalescence after acute diseases, or in anæmia and hysteria. By removing the heavy loads which oppress the stomach its work is facilitated, its elastic and contractile powers are allowed to rest and to recover, the stomach contracts to a smaller bulk, and regains its ability to set in motion peristaltically, at first small, and after a time larger quantities of food. On the contrary, where the dilatation is owing to cancerous stenosis of the pylorus, or to great cicatricial shrinking after ulceration, or where the coats of the stomach have, in consequence of chronic gastritis, undergone degenerative changes to such an extent as to allow no return to a normal condition, the treatment by the stomach pump could only afford relief, but cannot be expected to effect a cure. In cancer of the pylorus, the pain is sometimes even so much increased by the use of the pump that the treatment by it must be given up. In all these latter cases, however, the pump has a considerable diagnostic value, as after the stomach has been com-

pletely evacuated, the cancerous tumour becomes accessible to examination, while, when the stomach is filled, it escapes observation. The pump is also of use in enabling us to distinguish between dilatation of the stomach and distension of the colon transversum, which in some cases is absolutely impossible without the previous use of that instrument.

A curious symptom in three of the cases treated was that of convulsive attacks of a tonic character occurring during the illness. Spasmodic contractions affected chiefly the flexor muscles of the arms, and the muscles of the calves of the legs; but sometimes the abdominal muscles, and those of the face, jaw and neck, suffered likewise. Consciousness was sometimes lost, at other times merely impaired, or even quite preserved. These convulsive fits occasionally continued for several hours consecutively. They only occurred in patients who had lost all strength, and who appeared, as it were, dried up by the constant drain of liquid from the system. The exciting cause was always abundant and exhaustive evacuation of the stomach, either by the pump or by vomiting. The Professor thinks that these convulsions have the same pathology as the cramps occurring during cholera, being due to inspissation of the blood, and exsiccation of the nerves and muscles.

It appears probable that the influence of sarcinæ in the stomach has been somewhat exaggerated. In some cases enormous numbers of sarcinæ were present in the stomach, and nevertheless digestion and nutrition improved considerably all the time the pump was used. Sarcinæ sometimes resist obstinately the various medicinal substances which are, by the pump, introduced into the stomach.

Professor Kussmaul has used Vichy water, solutions of carbonate of soda, hyposulphite of soda, borax, and aqua creosoti, but without much effect; it is true that only weak solutions were employed.

Dr. Jürgensen,* of Kiel, has followed up Professor Kussmaul's investigations, and modified the apparatus used in the following manner:—He entirely dispenses with the pump, and utilises the syphon principle. He first introduces a sound into the stomach, and fills the organ through it with liquid, after which the sound is, by means of an india-rubber and glass tube changed into the short arm of a syphon, the long arm of which is furnished by another india-rubber tube. The patient is then requested to cough or to retch, upon which the syphon begins to play until the stomach is completely emptied.

The stomach-sounds which are generally used in France and

* "Deutsches Archiv.," vol. vi., part 2.

England, are, according to the same observer, not well suited for the local treatment of the stomach, being so narrow that it is impossible to contrive at their anterior end a sufficiently large opening, without the sound becoming twisted in a short time. Moreover, the two or four openings which are generally contained in the sound, are much too narrow to allow the passage of large morsels of undigested food, which are so often found in the stomach of patients suffering from gastrectasis. As soon therefore as the sound is obstructed, which is sometimes due even to bits of tough mucus, it is necessary to remove the sound, to clean and then to reintroduce it, which is very unpleasant to the patient.

The sound used by Dr. Jürgensen is 70 centimetres long, its walls are two millimetres thick, and its diameter ten millimetres. At its anterior end a knob of ivory, about two centimetres long, is tied on by means of a silken thread, to the india-rubber tube. This bit of ivory is hollowed out at its base, which looks towards the canal of the tube, and is meant to receive a rod of whale-bone, which serves as a guide for the introduction of the sound. On the side, and about two-and-a-half centimetres upwards of the knob, a hole is made corresponding in size to the diameter of the tube. On introducing the sound, the whalebone is first inserted into the canal of the ivory knob, and the tube then slightly pulled. The epiglottis is pushed down, not with the left index, as usual, but with the sound itself, on which the finger is made to rest, whereby more space is gained. As soon as the tube has passed about five centimetres downwards into the œsophagus, the piece of whalebone is withdrawn, and the sound must then be held tight, either by doctor or patient, since, in consequence of the excessive secretion of mucus, which is probably caused by irritation of the sympathetic nerve during the introduction, the instrument is so well lubricated that it is easily thrown out if the patient retches a little. The stomach is then filled with liquid, after which an ordinary india-rubber tube, from 1·5 to 2 metres long, and one centimetre in diameter, is connected with the sound. The patient is then requested to stand on a chair, and to cough or to retch. Immediately afterwards the liquid commences to flow out of the stomach, and continues as long as there is any in it. We will only add that Professor Niemeyer, of Tubingen, the author of the able treatise on pathology and therapeutics, recently translated by the Sydenham Society, and Professor Bartels, of Kiel, entirely corroborate, from their own experience, the good results which have been obtained by Kussmaul.

Dr. Brehmer,* of Görbersdorf, has published a second edition, which is entirely re-written, of his work on the causes and treatment of *pulmonary consumption*. He was, thirteen years ago, the pioneer of the view which has lately taken firmer ground in professional circles, that mountain air is the true curative of consumption. When his first edition appeared, his views were either ignored or ridiculed, but a great change has taken place since then, and Dr. Brehmer is now certain of at least a fair hearing.

The following is a précis of his views on this subject:—Pulmonary consumption is mainly the product of inflammation, proceeding to caseous infiltration. This latter occurs rarely after acute croupous pneumonia, but more in acute catarrhal inflammation, where the inflammation spreads from the finest bronchial tubes to the pulmonary vesicles; and most frequently in the chronic form of inflammation. Caseous infiltration of the pulmonary tissue does not always lead to immediate softening of the infiltrated parts and the formation of vomicæ, but only does so under certain circumstances. Tubercle without the previous existence of caseously softened parts is exceedingly rare. The greatest danger which people run who have caseously infiltrated lungs, is tuberculisation. Hereditary predisposition and sexual excesses on the parts of the parents, are the most powerful promoters of eventual casefication and tuberculisation, and a small heart likewise contributes to the same. With each contraction of the heart too little blood is then thrown into the lungs and the body, so that nutrition of the pulmonary and all other tissues is diminished and retarded. Moreover, in such people the thorax is generally longer than in others, and the lungs more bulky, the consequence of which is that the disturbance of nutrition becomes at first manifested in the pulmonary tissue. This also explains why diseases which cause enlargement and hypertrophy of the heart exclude tubercle.

Drugs cannot cure consumption; of this Dr. Brehmer is satisfied. Only diet and cosmical circumstances can do so. There is no consumption in Iceland, the Faroe islands, the Fiji islands, and the Kirghise steppe, and scarcely any in Caxamarca, and the mountainous regions of Peru. The principle which Nature pursues for the prevention of consumption is physiological increase of the rate of pulsation, which causes an increased waste of matter, and increased assimilation. The essence of consumption being retarded

* Die chronische Lungenschwindsucht und Tuberculose der Lunge, ihre Ursache und ihre Heilung." Berlin, 1869. Second Edition.

nutrition, or a sort of inanition, it follows that consumption cannot occur under circumstances where there are cosmical influences at work which accelerate the metamorphosis of matter in the individual, and therefore accelerate and increase the retarded nutrition of consumptives, so that it becomes normal. Consumption does not occur in high latitudes, is altogether rare as the elevation above the level of the sea increases; it does not occur at all in the Paramos, the Puna region of Peru, although the whites who live there are distinguished by the so-called consumptive habit, but the diminished pressure of the air accelerates the pulse and nutrition.

A permanent acceleration of the pulse will increase the size of the heart, just as working the biceps continuously, as in certain mechanical labours, will increase the size of the arm. The heart, under these circumstances, will become firmer, redder, and more vigorous. Fuchs has noticed hypertrophied muscular fibre of the heart in the habitants of the Upper Hartz mountains, and Brehmer himself has found that in Görbersdorff, which is 1,700 to 1,800 feet above the level of the sea, nine natives out of ten have a slightly hypertrophied heart. A small heart with feeble and lax-muscular fibres, being the essential cause of consumption, this disease cannot exist under such cosmical conditions as cause a firm, large, and well nourished heart. A further deduction from this principle is, that consumptives must be worse when the glass is high, than when it is low. The glass being, as a rule, higher in winter than in summer, winter is the worst season for consumptives. Diminished pressure of the air counteracts stagnation of the blood, and thus acts beneficially on consumption.

The author then enters into a sarcastic description of the present and "irrational mode" of treating consumption, after which he gives his own "rational mode" of treating the disease. This is, in the first instance, a good and nutritious diet, including Hungarian wine, and milk-and-brandy; fresh air, increase of the activity of the skin by wet-rubbing, and shower-baths, lasting from 5 to 45 seconds. The latter he considers a specific against hectic fever. A jet directed to the seat of the disease itself in the chest is apt to induce absorption of the infiltration. The last remedy is diminished pressure of the air, such as we find it in Görbersdorf, and a few similarly favoured localities, viz., valleys at high elevations, free from native consumption, and protected from winds by being on all sides surrounded with mountains. Swiss valleys are objectionable, on account of the neighbourhood of glaciers, which do not exist in Görbersdorf, and their absence renders this place so uncommonly valuable. The remainder of

the work is occupied with the history of twenty-four cases, which have been treated in the doctor's institution.

Dr. Tobold,* of Berlin, has published a second edition of his valuable little book on *laryngoscopy*, and the local treatment of laryngeal diseases. It contains a complete guide for the practitioner in his management of these diseases, and an appendix on the anatomy and physiology of the larynx.

Subcutaneous injections of Bichloride of Mercury in the treatment of Syphilis, which were originated by Dr. Lewin, of Berlin, some years ago, have been somewhat extensively tried by other observers, and the results have on the whole been unsatisfactory. The great objection to the proceeding seems to be the pain and inflammation of the cellular tissue following the operation, while no corresponding advantages are obtained in quickness, and certainty of results. Such, at least, is the opinion of most of the hospital surgeons in Vienna who have tried the proceeding, and who are decidedly against the method. Under these circumstances, Dr. Hagens,† of Spandau, has come forward to report his experience of the injections in the military hospital of that fortress. He comes to the conclusion that relapses are less frequent with this than with any other mode of treating syphilis; that the disease lasts a shorter time than with any other treatment; and that, if relapses occur, these come on much quicker than usual, and may be put down by a repetition of the same method. An eventual cure of the syphilitic infection of the system is therefore to be expected, on the whole, in a much shorter time with injections than with other methods. The quantity of mercury introduced into the system is also much less than either by mercurial inunction, or stomachic administration.

Dr. Caspari,‡ strongly recommends carbonised water-baths for the treatment of *progressive locomotive ataxy*, and relates two cases in which these baths, taken at the Spa Meinberg, in Northern Germany, proved successful.

Paracentesis of the abdomen in pneumatosis gastro-intestinalis is, by Dr. Julius Stein,§ of Bayreuth, employed in tympanites, which

* "Lehrbuch der Laryngoscopie und des local-therapeutischen Verfahrens bei Kehlkopfkrankheiten." Berlin, 1869.

† "Deutsche Klinik," 1870.

‡ "Deutsche Klinik," March, 1870.

§ "Deutsches Archiv," vol. vi. pt. 2.

threatens life. He relates two cases in which the operation was repeatedly performed, and although both patients died ultimately, yet considerable relief was generally afforded by the paracentesis, which the author of the paper thinks a perfectly innocuous proceeding.

Dr. Julius Kühn,* surgeon to the police, and *Privat-docent* at the University of Leipzig, has published an extremely valuable monograph on the *blennorrhoic affections of the male and female organs of generation*. The motto of the book, "Omnia quae insunt Vidi," is fully borne out by its substance. The only blemish which attaches to the book consists in the occasional use of German students' slang, which we think quite unsuitable to such a subject as is treated by the author, and which he would do well to remove in subsequent editions. The matter itself is thoroughly practical, both where diagnosis and treatment are concerned. There is no scientific bombast whatever, and the style is, on the whole, simple and easy.

The most important portion of the book is the chapter on gonorrhœa in the male, which is treated in the fullest manner, and with the aid of which a surgeon will be able to treat satisfactorily almost all complications of that insidious disease. The author makes at once, and with great justice, a wide distinction between *acute* and *indolent* gonorrhœa, which we do not find in most handbooks. Thus, for instance, in Niemeyer's handbook, recently translated by the New Sydenham Society, and in the article "Gonorrhœa," in Holmes's "System of Surgery," this disease is described as if it were invariably attended by acute and severe sufferings, and as if it always followed certain stages, which were quite distinct from one another. It is, however, perfectly well known that many patients have throughout the disease nothing to complain of except the gonorrhœal discharge, and that there is neither dysuria, nor painful erections, nor any other symptoms of inflammation. Yet that the disease essentially is gonorrhœa is proved by its invariable origin in impure connexion, and by its being able to be suddenly transformed into acute, painful gonorrhœa by any excesses the patient may commit, especially in drinking, or sexual intercourse, or by accidentally taking cold; and also by its being frequently attended with the usual complications of acute gonorrhœa, such as epididymitis, etc. The treatment of the different varieties

* "Die blennorrhoischen Krankheiten des männlichen und weiblichen Geschlechts, ihre Erkenntniss und Behandlung." Leipzig, 1869, pp. 388.

of gonorrhœa, both in the male and female, is most amply gone into, and the work would bear translation into English.

On the Antiphlogistic Effects of Faradisation. — Dr. Weisflog, of Zürich, has used faradisation systematically in inflammations of the joints, in which he thought it easy to determine the effects of the agent, because not only is no error in diagnosis possible, on account of the ease with which the disturbed function, the altered form, and the increased temperature may be determined, but also because the decrease of these symptoms is an evident proof of the efficacy of the therapeutical measures employed. The general principles which guided him in the application of the electricity were the following:—(*a*) Only to employ a current which is not sufficiently strong for causing muscular contractions; muscular contractions would, owing to the motion of the joint caused by them, be intolerable to the patient, and would increase the pain; (*b*) to apply the electrodes not only to the joint itself, but also on the surface of all the muscles connected with it, and that in the direction of the venous circulation; and (*c*) instead of one somewhat prolonged daily application, to have several shorter ones. As it was under these circumstances impossible that the medical practitioner himself should make all the applications, he instructed the relations of the patient in the mode of applying the electricity. Repeated short applications he thought better than prolonged and infrequent ones, because the constriction of the capillary vessels, which it is intended to produce by the faradic current, takes place in a very short time, while a prolonged application produces excessive dilatation after constriction.

The general results of these experiments have been that some inflammations are made worse by the proceeding, while others are relieved, but not cured; and again others yield more readily to faradisation than to any other remedy with which we are acquainted. Thus it appears that acute rheumatic inflammation of the joints is made worse by electricity; this should never be used while there is still fever and pain, and can only be of service where it is necessary to remove any products of inflammation. In senile arthritis with deformity, the pain was generally relieved for the time, and the patients preferred faradisation to the subcutaneous injection of anodynes, as the former did not produce any unpleasant collateral effects. The best cases for faradisation are those of traumatic and scrofulous inflammation, which, on the whole, yield rapidly to the remedy.

Dr. Brenner,* of St. Petersburg, has published the second instalment of his work on *electro-therapeutics*. Brenner does not attempt to give a systematic view of the whole subject of electro-therapeutics, but has taken, apparently at hap-hazard, certain subjects on which still much uncertainty prevails, and endeavoured to elucidate them by his own researches. The first subject treated by him is the development of a rational method of electro-diagnosis. He starts with the principle that the physiological effect of the two poles is as different as their chemical action; that, if both electrodes are placed on different parts of the body, we receive always the effect of that one either exclusively, or at least principally, which corresponds to the more excitable point; while, if they are placed on corresponding parts, the phenomena appearing within their sphere are essentially different. In general he recommends that the second electrode should rest at a distant point, which is indifferent for the mode of contraction which is to be effected. In order to determine the effect of the cathode, the electrodes should be placed so as to correspond approximatively to that position which would appertain to the descending direction of the current; while for ascertaining the action of the anode, the position of the electrodes should be such as to correspond approximately to the ascending direction of the current. He also recommends that the electrodes should be fixed, and that the interruptions of the current should be exclusively performed in the metallic portion of the circuit. He then enters into the pathological deviations from the normal mode of contraction, and shows that, whereas the reaction of the healthy nerve or muscle follows a certain inflexible law, every deviation from the same indicates a disturbance in the vital conditions of these organs. The second part of the book treats of cerebral palsies, which he recommends to treat by peripheral, and not by cerebral galvanisation, which latter he considers dangerous. After a few remarks on peripheral palsies, the author proceeds to a most severe criticism of Benedict's work on electro-therapeutics, which he stigmatises as totally unreliable and dangerous, and liable, if followed as a guide, to lead to terrible mistakes in diagnosis, prognosis, and treatment. The fourth part of the book gives the results of the author's experience of the galvanic cautery, and the electrolytic treatment in certain forms of tumours, stricture of the urethra, etc.

* "Untersuchungen und Beobachtungen auf dem Gebiete der Electrotherapie," vol. ii. parts 2-4. Leipzig, 1869.

Professor Sycyanko* has contributed the following to the antiphlogistic effects of the continuous current:—A man, aged 48, suffered from acute gingivitis near the molar teeth of the left upper jaw; he had had several previous attacks of it, which lasted from eight to ten days. Sycyanko put a silver plate on the diseased gums, and connected it with the positive pole of 20 cells, while the negative pole was placed on the same side of the neck continuatively for 2½ minutes, with double voltaic alternatives. After this the swelling appeared softer, and was painless; the next day the mucous membrane was quite recovered. In three similar cases he obtained the same result. He thinks it important to put the anode to the inflamed parts, because it has an anæsthetic effect on the sentient nerves, dilates the capillary vessels, and promotes absorption.

Dr. Hagen,† of Leipzig, has used Brenner's method of treating *deafness* and *tinnitus aurium* with considerable success. In turbidity of the membrana tympani, in simple hyperæsthesia of the auditory nerve, and similar conditions, the current has, on the whole, answered very well in Hagen's hands. Professor Erb,‡ of Heidelberg, has made a number of experiments, in order to test Brenner's observations, and comes to the conclusion that in all essential points they are correct. On the other hand, Professor Benedict,§ of Vienna, declares Brenner to be a member of the literary "demimonde," a scientific forger, etc., and promises to rout his principles thoroughly in a forthcoming publication.

The *electrolytic treatment of certain surgical diseases* has been pursued, amongst others, by Professor Dittel,‖ of Vienna. A case of hydrocele was nearly cured; five cases of varicose veins, and one case of varicocele were completely cured. Dr. Neftel,¶ of New-York, has by the same means cured a bad case of medullary cancer in a patient who had already undergone two operations by the knife, and who was apparently near death. Three applications, by means of Dr. Althaus's serresfines-conductor, completely removed the tumour, and the general health of the patient improved *pari passû*.

* "Berliner klin. Wochenschrift," No. 22.

† "Practische Beiträge zur Ohrenheilkunde." Leipzig, 1869.

‡ "Archiv für Augen- und Ohrenheilkunde von Knapp und Moos," vol. i. p. 156.

§ "Wiener medizin. Presse," May, 1870.

‖ "Oesterr. Zeitschrift für pract. Heilkunde," pp. 17, 18.

¶ "Virchow's Archiv," Nov. 1869, p. 521.

PRINCE EDWARD'S ISLAND.

Report by Wm. Hamilton Hobkirk, M.D., F.R.C.S.
(*of Charlotte Town*).

Climatology, in relation to its effects upon health, is well marked in this part of America, subject as it is to extreme and sudden transitions of temperature, influenced by prevailing winds at different seasons of the year, and affected in winter and early spring by fields of ice in the River and Gulf of St. Lawrence, as well as by oceanic currents.

The warm Gulf Stream, after running up the eastern shores of the American Continent, takes an easterly direction in about lat. 45° N., passes on to Newfoundland, and there meets the returning Arctic current. Fogs accompany the Gulf Stream in its northerly course, and as it approaches colder latitudes, they may be said to be almost constant.

Prince Edward's Island being situated in the direct line of the cold Arctic current running down the eastern shore of Labrador into the Gulf of St. Lawrence, through the Straits of Belle Isle, and uninfluenced by the warm Gulf Stream, enjoys, during the summer months, a cool clear atmosphere, free from fog; and water which for bathing purposes is unequalled.

The winds which are prevalent at certain seasons of the year influence the health in a remarkable manner, as do also the very sudden changes of temperature, to which we are subject in winter, varying in a few hours from 40° above freezing to 10°, 20°, or even more below. These rapid changes are always occasioned by changes of wind from S.E. to N.W. Persistent easterly winds in spring, passing over icy seas, are particularly piercing and distressing, and they are also a fruitful source of various diseases of the respiratory organs. Pneumonia, bronchitis, and catarrhal affections are the most common. The low temperature in winter, when not too long continued, is generally well borne by the healthy, when in active exercise; but amongst the inactive, and those who live in over-

heated apartments (which too many do), tiresome dyspeptic complaints and other derangements of the digestive functions prevail, as well as rheumatism and neuralgic diseases. Phthisis is a very common complaint in Prince Edward's Island; its prevalence is also common throughout all the Lower Provinces and the New England states; and it is singular that while it is so prevalent in the eastern part of the continent, it is almost unknown in the Western states, and of very rare occurrence in Western Canada.

Instances are not wanting where persons suffering with all the physical signs of tubercular deposits, accompanied by a free hæmoptysis, have perfectly recovered by a residence in the Western states.

A young physician lost flesh, had frequent attacks of hæmoptysis with distressing cough, slight expectoration, dulness at apex of the left lung and under clavicle, etc.; after a year's residence in California he perfectly recovered, and is now successfully following the arduous duties of his profession in that country.

A young lady, with symptoms not unlike the above, but with more abundant expectoration, after several months' residence in Minnesota gradually recovered her health, and has since been married.

The first case, being unable to take cod-liver oil, was treated with muriated tincture of iron and carbonate of soda alternately; the second case with cod-liver oil and light tonics—accompanied by generous diet, in both cases.

The last winter was unusually mild, followed by a cold spring, in consequence of long prevailing easterly winds. Bronchitis and catarrhal affections were very prevalent, which were treated most successfully by salines and antimony. Cases of pneumonia were frequent, and the most difficult to treat, as we seldom see them in their earliest stage, namely, that of engorgement and early exudation within the cells and bronchioles—which appear to form the local phenomena of pneumonia—giving rise to the crepitant râle during inspiration, probably produced by the separation of the coherent walls of the cells, and bronchioles glued together at the end of inspiration by viscid morbid matter. Bleeding we seldom have recourse to, and it is, as a rule, badly borne in acute diseases in this country. Antimony is the most to be depended on as a medicinal remedy; mercury, unless given early, is injurious, as tending to favour suppurative infiltration.

A lady, aged 35, subject to a cough and expectoration for a short time, otherwise healthy, was suddenly seized with

difficulty of breathing, deep-seated pain in the chest, and general febrile symptoms, which in a few hours increased to urgent dyspnœa, almost threatening suffocation; inability to lie down; constantly calling for fresh air although the doors and windows were open; cough frequent with a tenacious expectoration, slightly coloured; face livid; the left side of the chest dull on percussion, the right side less so, but crepitation on respiration heard on both sides anteriorly with the exception of a small space under right clavicle, where the respiratory sounds were harsh; considerable vocal resonance posteriorly, where there was marked dulness over more than two-thirds of the inferior part of both lungs to their base; the body and extremities were covered with cold perspiration, with the exception of the chest, which was warm; pulse small and too rapid to be counted; subcutaneous veins injected; respiration 45 to 50. It was evident that unless the circulation was relieved suffocation would take place, the patient was bled to 20 ounces, which afforded much relief; eight hours after she was cupped to 12 ounces. Brandy and beef-tea were freely given during the night.

Second day. Pulse 120 and fuller, dyspnœa again increased, cough constant with rusty gelatinous expectoration, dulness increased slightly: bled to 16 ounces. Brandy, wine, and beef-tea.

Third day. Expectoration freer and more coloured, able to lie in a recumbent position with head and chest raised, dyspnœa still urgent, vesicular respiration lost at the posterior half of the lungs, vocal resonance considerable, pulse 120; bled to 12 ounces. Brandy, milk, beef-tea, and a little champagne.

Fourth day. Pulse 110, able to lie down in bed, skin very moist but warm, expectoration free, less coloured but more purulent and gelatinous, crepitation more audible posteriorly.

Fifth day. Expectoration very copious, fetid and purulent, no discolouration; breathing much easier. From this time there was daily improvement, and the patient was convalescent on the 14th day.

As she improved, the brandy affected her head, and wine was substituted.

Mr. A., of spare habit, after a rigor was seized with dyspnœa followed by febrile symptoms, pain in the chest and inability to lie down, cough with a deep and rather free prune-juice expectoration, some delirium, pulse 100, full, soft and compressible. On examination there was dulness, bronchial respiration over half of left lung, with coarse crepitant râle in other half of left lung and lower part of right on inspiration (not unlike the pressing together and separating the finger and thumb moistened with thick paste); vocal resonance considerable.

Antimony was given in small doses on the first day. Brandy, beef-tea, and milk were freely prescribed, followed by more solid food when it could be taken; no other medicine. Convalescent on the 10th day.

I record these cases simply to show the usual plan of treatment which appears best adapted to meet the several symptoms.

Pneumonia and other inflammatory affections often run a rapid course in this country, and no treatment is of any avail unless early applied; but I have no doubt that nourishment judiciously given forms an important element in those cases, particularly when they assume the more asthenic forms. Calomel we give rarely, and only in small quantities early in the attack, when the serous membranes are involved. The same may be said of opium, to procure rest.

NEWFOUNDLAND.

Report by Wm. Anderson, M.D., C.M. (*of Brigus.*)

Etiology and Hygiene.

Further experience has shown the remarks on the etiology of phthisis in last year's Report * to be well founded. At present I know of cousins of the individuals referred to who are the subjects of pulmonary consumption. One family of my acquaintance here has lost three members by consumption, coming on at and after the adult age. The parents (English) are strong and well, and advanced in years; they cannot trace consumption in their descent on either side. A son and daughter, both adult, are phthisical; the children of the family are, for the most part, natives of other colonies. A son, who came as an infant to Newfoundland from Canada, has a cavity in the upper lobe of his left lung. It is not intended to be implied that phthisis may not arise in non-tuberculous families almost anywhere. The present case is only given as a clear and remarkable instance of such an occurrence in this country.

The occupation of the greater part of our population is fishing, and as the toil is severe, so, when at all possible, the diet is generous, more so on the average than that of the English and Scotch labourer, so far at least as animal food is concerned. The clothing and housing are of a superior character also. In former days open chimneys, with dog-irons on which logs were laid, were the chief means of warmth amongst the working classes. At present the majority have close iron cooking stoves, and have the old chimneys boarded up; in the latter case the ventilation is not so good, and the air of the apartment highly rarefied. However, no theory accounting for phthisis could be based on this, as the disease has not been observed to be more common amongst those who use cooking stoves, than amongst others; nor is it less common amongst the better classes who use grates similar to those used in England and Scotland. The houses are wooden, of all different styles, with the sills laid on stone walls forming the

* See "Newfoundland"—"Reports" for 1869.

cellarage, on rocks, or on piles. They are, when well built, very comfortable indeed, and well calculated to shelter from the biting cold of our winter.

Climate.

The climate is not so moist as generally supposed. Fogs are unfrequent on the land, but, according to all accounts, very prevalent seaward. They get occasionally blown in on the land by long duration of easterly winds, but invariably vanish rapidly when the wind changes westward. South-west winds bring fog or drizzling rain. On the whole, the south wind brings most rain. The winds are very variable, and changes of temperature occur frequently and suddenly. The present season has been quite exceptional; the wind has been almost altogether westerly, though the well-known "black nor'-easter" has occasionally come to chill us for a time. A regularly instituted series of observations of the weather, the temperature and rainfall, would alone afford grounds on which a resident of another climate could form an opinion of the climate of Newfoundland. It has been generally remarked that those who have come here sound and strong have enjoyed robust health, and lived to a good old age.

Treatment of Disease.

In a case of puerperal peritonitis, which occurred in a woman delivered of her twelfth child, in April, 1868, death seemed imminent from exhaustion immediately induced by vomiting, which ice, effervescing mixtures, and everything else taken by the mouth only aggravated. Subcutaneous injection of morphia was then tried with the best results. Twenty minims of the liquor morphiæ hydrochlor. were used at one operation. The patient declined any further trial on account of the forming of a large bleb, filled with a dirty brown serum; but the vomiting abated within a very few hours after the use of the remedy. The solution, prepared with one-half more water than the quantity ordered for the liquor (B.P.) causes scarcely any pain when injected.

Pathology.

A man, aged 42 years, died in December, 1869, from hæmatemesis. Quantities of echinococci, of the shape and size of apple-pips, and of a greenish colour, many of them free, some aggregated, were found in the blood vomited. Pieces of cyst, of a green colour, and

partly cretified, with echinococci adherent, were also found. The man had been in the habit of vomiting blood, at intervals of varying length, for nineteen years; the discharges of blood were preceded by a sensation of weight at the epigastrium. No post mortem.

Recently a case occurred of pericarditis in a girl of 11 years of age. It was not associated with articular rheumatism. For some days preceding the development of a to-and-fro murmur, which was very marked a few hours before death, there was great suffering from pains of a vague, unsettled character in different parts of the chest, sometimes in the axilla, sometimes in the shoulder, and sometimes in the hypochondrium of either side. There was great anxiety of countenance, and severe dyspnœa before the local phenomenon referred to became perceptible.

In two cases of valvular disease of the heart that recently came under notice, a sickly saccharine odour of the breath was perceptible. The mitral orifice was affected in each case, and there was dilatation of ventricles with hypertrophy. Dropsy was present. The cases are mentioned to give the opportunity of stating that in every case of mitral disease that I have seen, the saccharine breath has been noticeable.

Summary of important cases occurring in St. John's Hospital during the year 1869, *by* CHARLES CROWDY, M.R.C.S. (*of St. John's*).

Typhus fever.*	Admissions.	Deaths.
Under 10 years of age . . .	80	0
From 10 to 20	212	4
„ 20 to 30	129	8
„ 30 to 40	99	15
„ 40 to 50	64	10
„ 50 to 60	42	14
„ 60 to 70	24	12
Above 70 years of age . . .	7	5
Total . .	657	68

The type of the disease was mild-epidemic, attributable to want and overcrowding.

Eruption present in nearly all the cases; it was sometimes rose-

* It would appear that typhus and enteric fever are here classed under the head of typhus.—ED.

coloured, sometimes petechial. Complications rare, and chiefly pulmonary.

In most cases the intellect was but little obscured. (See "Newfoundland"—"Reports" for 1869.)

Oakum, as recommended by Pollock, was found an excellent application to bed-sores, in fever and many other cases, giving comfort to the patient, and diminishing fever remarkably.

Cases of Surgical Injury.

1st. A gun burst within 18 feet of a boy aged 12; a large fragment struck him on the head. He was brought a distance of nine miles in the night, December 22nd, 1868; the cold extreme. Face was found covered with blood and brains. Patient conscious, but cold and collapsed from loss of blood and exposure. There was extensive laceration of the scalp, and severe fracture of the left parietal bone, a portion being entirely blown away, so as to leave an opening the size of half-a-crown. Dura mater was considerably lacerated; a large quantity of brain substance had escaped. There were several radiating fissures in the parietal bone, and a piece was depressed, without symptoms.

Carbolic acid lotion was applied to the wound. Patient slept well during the night, and had rallied next morning. Recovery was uninterrupted and complete.

2nd. Case of transverse fracture of patella, occurring in a lady endeavouring to recover herself from a slip on the ice.

3rd. Case of fracture of the os calcis from action of gastrocnemius. Recovery, almost perfect, by ligamentous union.

Pathology.

1st. Case of enchondroma of the middle finger. Two first phalanges almost completely absorbed. Circumference of tumour 12¼ inches.

2nd. Case of fungus hæmatodes. Patient aged 26; male. Extending from the middle of the clavicle to the middle of the humerus, and involving the scapula, measuring nearly 36 inches in circumference at level of axilla. Nine months ago the tumour was as large as half a moderate sized orange, and was connected with the head of the humerus.

ICELAND.

Report by J. HJALTALIN, M.D., *Chevalier de la Legion d'Honneur, Knight of the Order Dannebroge, and Chief Physician.*

THE year 1869 was, on the whole, rather salubrious for the Icelanders; no epidemic, except a mild influenza, prevailed, and only sporadic cases of typhus, typhoid fever, and of pneumonia, and several other acute inflammations came under treatment. The mortality was nevertheless not beneath the average rate, and even somewhat higher in children, of whom also a greater number than usual were stillborn. The atmospheric pressure and temperature were, as may be seen from the following table—kindly summed up for me by our most able observator, Rev. Minister Pálson, who is yearly taking meteorological observations for the Scottish Meteorological Society:—

MEANS OF OBSERVATIONS MADE IN REYKJAVIK, 1869—70.

Month.	Barometer.	Thermometer. Fahr.
1869.	Inches.	Degrees.
September	29·731	41·96
October	29·855	39·00
November	29·575	24·12
December	29·747	19·48
1870.		
January	29·451	33·22
February	29·666	31·24
March	30·010	23·64
April	29·559	30·12
May	29·853	41·48
June	29·751	46·42
July	29·706	50·16
August	30·081	53·12

From this table it may be seen that the mean atmospheric pressure at Reykjavik of the four last months of 1869 did not differ much from the mean barometer height of the foregoing year, but the thermometer showed a considerably higher degree of heat in 1868 than in the following year; in this year (1870) the atmospheric pressure of May and June has been somewhat higher than in 1869. In the month of June several cases of typhus and typhoid fever occurred in our little town, and some patients were also brought into our harbour by the French fishermen, who, during the summer are in great number all round our island. It is reckoned that about 300 to 400 French fishing vessels are yearly stationed on the fishing banks round Iceland, and as there are about twenty sailors in each vessel, it is no wonder that many of them are seized with typhus and some other acute diseases. It was especially in one French fishing vessel that the crew seemed to be in a very dangerous state, as nearly half of them were sick of a very malignant typhus. When I went on board this vessel I found that the disease was generated by impure air and crowding together of twenty-two sailors in a small room; the most affected were immediately brought on shore to our hospital, and although they were in a bad state, comatose and delirious, they soon recovered under the use of pure air impregnated with iodoform vapour and of restorative nourishment. The vessel was also disinfected by iodoform, and all went on well in a week, except one patient, who, on account of gangrenous bed sores, had a longer convalescence, but left us in a month quite well.

Previously two families in town had been affected with pythogenic fever, but they also recovered.

In the eastern part of our island typhus and typhoid fever occurred sporadically during the spring, and were evidently spread by contagion; nearly half of the affected were lost, but I understand that they were all treated by the so-called "expectant method," or rather were not treated at all, except, perhaps, symptomatically, which very often may be looked upon as quite insufficient.

On this occasion I shall not omit to make a few, but very short, remarks upon a treatment which I now, during more than a decennium, have used in all kinds of malignant fevers that have come under my care, and to this I have given the name of "the disinfecting treatment" of typhus and typhoid fever. In an article which is to be found in the "Edinburgh Medical Journal" for 1863, Vol. VIII., p. 214, I ventured to put forth my arguments for the usefulness of this treatment; and I have now, from the year 1858, up to this time always made use of it with very favour-

able success. During the four years from 1858 to 1862 I had to deal with very severe epidemics, both of pythogenic and contagious typhus; and as I then, according to the views of Scandinavian physicians, was inclined to look upon pythogenic fever and contagious typhus as quite identical in their intimate nature, I was in the habit of using the same treatment for both; but I have now, after having read Dr. Charles Murchison's most excellent work, "Treatise on Continued Fevers," and having had the pleasure of conversing with him, come to a better understanding in this matter. But although I feel quite convinced of the exactness of Dr. Murchison's observations regarding the true nature of these two different fevers, I cannot deny my belief in the usefulness of a disinfecting treatment, not only in both of them, but also in other contagious malignant fevers, as famine fever, cholera, scarlatina, &c., &c., and I feel moreover convinced of its advantages in all zymotic maladies.

Since I wrote my aforesaid article in the "Edinburgh Medical Journal," I have met with a great many cases of contagious fever, typhus, famine fever, pythogenic fever, and dysentery, and have always treated them in the same manner with the best result, and all of them have recovered in much shorter time than they would, I think, have done by the expectant method, or the generally adopted symptomatic treatment.

Disinfecting Treatment of Typhus and some other Zymotic Diseases.

As to the disinfectants used by me, I must remark that they have been of several kinds; and although I was formerly in the habit of using oxidising disinfectants, as chlorine, iodine, and iodoform, I have of late also employed deoxidising compounds, especially sulphurous acid, which I regard as the most effective disinfectant, and less noxious than hydrochloric acid gas evolved from salt and oil of vitriol, or the chlorine evolved from chloride of lime. I think that oxidising disinfectants produce their effects by chemically destroying contagious substances of whatever atomic combination they may be; the deoxidising compounds will, no doubt, act in a similar manner, although in an opposite direction, as they absorb oxygen, liberating carbon, nitrogen, and hydrogen, but the consequences of this chemical action may even be dangerous, if continued for a long time. On this account I look upon sulphurous acid as unfit for a prolonged use; for although it is, no doubt, one of the surest and strongest disinfectants, it ought, according

to my experience, to be employed with great caution, and at long intervals, for, if long continued, it cannot fail to deteriorate the atmosphere, and thus occasion mischief instead of doing good. There is also a severe effect on the respiratory organs from long continued use of it, especially if it is inhaled in great quantity, but this is far less the case with iodoform, which may also be used internally with favourable results. Condy's Disinfecting Fluid has been largely used in my practice of late, and I think it has a favourable effect in preventing the spread of typhus and other contagious diseases. Carbolic acid, cresolyt acid and creosote, seem especially indicated to prevent the spreading of bed sores and gangrenous sloughing occasioned by erysipelas or malignant erythematous swelling and carbuncles. In "panaritus" and malignant paronychia I find even very much diluted lotions of carbolic acid or creosote of the greatest effect. In some cases of malignant whitlow, which in this country is extremely common amongst our fishermen during the fishing season, I have used a kind of paste, made up of fine earth and very much diluted carbolic lotion, with which I have covered the whitlow, leaving it alone for three or four days, after which time it often has been much better, and sometimes quite cured, or, at least, become so mild, that it has healed in a short time. Other malignant ulcers have been treated in a similar manner, and will always be so in my practice. It would, no doubt, lead me too far in this brief report if I should relate all the cases treated by me according to the disinfectant principles. This is, also, I think, at present of little use, as modern medicine seems still very much inclined to the expectant treatment. The "do nothing" principle is undeniably still fashionable, and, therefore, we read anew in one of the best and most practical medical newspapers that can be had,* "The great majority of cases tend to get well, they have, so to speak, a lifetime of their own, with their periods of growth, maturity, and decline. Treatment cannot change their nature, cannot expel them at once, cannot quench them, cannot materially shorten or prolong their existence." Thus runs the fashionable talk, and exactly thus it ran about fifteen years since in a Danish medical newspaper, called "Hospitalstidende;" not only the meaning, but also the words were the same. The author of that newspaper was also a very able physician, and is still, like the author of the words I have quoted, Dr. Francis Sibson, held in great esteem. Eventually he came, of course, to the conclusion that homœopathy cured just

* See "The British Medical Journal" for 13th August this year, p. 160.

as well as allopathy, and it seemed to me that he was quite right in his logical deductions. If his premises were right his conclusion could not be blamed.

Rheumatism Acute and Chronic.

In a country like Iceland, where the winter is so extremely changeable, rheumatism in all its forms is one of the most common complaints, and it is natural that the chief physician, who is always in activity amongst a great part of 20,000 inhabitants, should get many of such cases to treat. Could then "rest and ease," as some believe, do all that is wanted, or the most part of it, the Icelandic doctors would have an easy remedy at their hand, and there would not be any reason to try other remedies, specific or rational, against this most frequent and very often dangerous malady. My humble opinion, in the mean time is, that an Icelandic doctor proceeding thus would often, in a short time, have a good many patients at "ease and rest," and that the strong and active Icelander would believe himself tormented and kept from his work longer than necessary; he would say, "Why don't you, Doctor, either give me kali poultices, or anti-rheumatic drops, or sweating remedies, which so often have relieved others in a short time? You know I am a labourer, and must earn my bread, and being painful and sleepless, I shall be weaker and weaker, and more and more unfit for any hard labour. Blister me! give me some drug that I may get into a perspiration; give me those good anti-rheumatic drops that cured my friend in a short time. I was on the sea, and got wet; or I was travelling in cold weather; my perspiration has been stopped; relieve that, and I shall be better. A friend of mine who was thus affected, and could get no remedy, in due time got plenty of 'rest,' for he was in bed for a month or more, and when he got out of it he was quite stiff, and so he remains still. Give me some remedy, I cannot bear this pain! I have no rest, no sleep," etc.

Tell such a patient that "rest and ease" will put all things right, and he will laugh you in the face, and if he is a sensible man, and knows a good deal of the world, he will point out a long series of patients who, after a protracted confinement to bed, have never recovered from a rheumatic affection, which, in the beginning, might have been easily relieved or cured by simple sudorifics and saline draughts employed in due time. I have seen a great deal of patients in this country with severe heart-diseases, and see them sometimes daily, and I have very often satisfied my-

self of this being occasioned by a rheumatic fever, which, for want of medical aid, has run its own course, to the ruin of the patients.

Nature of Diseases and their Cure by Remedies.

Diseases are, according to my conviction, no mystic entities which must run their own course before they can die out. They are irregularities in the system, occasioned by poisons or pure physical abnormities, or pathological chemical changes, by no means out of the reach of medical science, provided that science does not satisfy itself with some mystical reasoning, or with casting anchor under the shelter of Van Helmont's *vis medicatrix naturæ*. The advice of Ovid when he says:—

> "Vide ergo, quod primum fuerat sanabile vulnus,
> Dilatum longæ damna tulisse moræ,"

still holds good. I have a great esteem for British physicians, and their profound learning; I believe that they are, as yet, unsurpassed in medical science; but when I hear some of them following the Vienna school's "do-nothing" principles, I can hardly go with them.

But, as I feel no desire to make proselytes, and regard myself as unfit for that task, I shall not enter more deeply into this topic, but only remark that my belief in physic has, during my thirty-three years' medical career become more and more firm and steady, provided that remedial agents, whatsoever they may be, are used with skill, in due time, and with due perseverance. The most simple remedial agents, as cold water and ice, may sometimes do wonders, and save life which else might be lost. The intuitive principle of Priessnitz, "Wo es nur brennt, da muss man löschen," sounded in my ears very like the words of an oracle, when, nearly thirty years ago, I heard it from his own mouth, and very often have I since that time had occasion to see what wonders ice and cold water can do in some of the most dangerous diseases. Since that time my reason has told me that if the simplest of our medical agents can do wonders and save life, then the other innumerable medical stuffs and drugs cannot be without great effect, provided we ourselves do our duty in investigating their action on the deranged system. But, thanks to science, especially to chemistry and experimental medicine, which recently in the inventions of chloroform and chloral by Dr. Liebreich and the late Sir James Simpson have given us two most beneficent boons from heaven, which, in my humble opinion, point in quite a different way

from that followed by some unhappy medical philosophers, who take but little interest in the action of medicines on the system. To the patients the sentence of old Celsus still holds good, "Non interest scire quid morbi sint, sed quo modo leventur."

The Echinococcus Disease.

This endemic complaint continues to be one of our most common chronic diseases, and a considerable interest is now taken in its treatment. In the beginning of the disease most of us continue to use the tinctura kamalæ internally, and, as it seems, with good success. Nearly all long standing cases of hydatid tumours must be punctured, and I have invariably found that the proceeding of Dr. Charles Murchison, in performing this operation, is the best and surest method of curing all long standing hydatid tumours. During the last year many of these puncturing operations have been performed by a young physician, Dr. Jonasson, and most of them with good success, although the sac has refilled in many cases with purulent matter, and a second puncture has been necessary.

According to the unanimous wish of the Icelandic Diet, the "Althing," a little medical school,* is established here in Reykjavik under my guidance, where candidates from our Latin college, who may wish to learn medicine, are admitted, and Dr. Jonasson is appointed as a second teacher in this school. We have a little hospital at our disposal, which has been erected by benevolent contributions, and I feel thankful to mention that one of the chief contributors is a Scottish gentleman, who, on account of his benevolence towards this island, is well known and in high esteem amongst all Icelanders. It is still more to be thankfully remembered that an English *doctor* has given a considerable sum of money to our little hospital. The consequence of this beginning of our medical instruction is, that autopsies and dissections are yearly becoming more frequent than they used to be, and this will, in time to come, elucidate many still unknown facts regarding our frightful hydatid disease. In our

* This little institution is very much abused by a Swedish tourist, Docent Paikull, in his book "A Summer in Iceland," translated into English by Rev. M. R. Barnard. I have in a little pamphlet, written in the Danish language, demonstrated the worthlessness of this book. It is full of inaccuracies in a scientific point of view, and the author has had the bad taste to abuse those who showed him hospitality. For those readers who wish to know the natural history, etc., of this island, the book of Professor William Preger and Dr. Ferdinand Zirkel will be found the best to refer to.

little hospital 10 hydatid patients have been treated by the puncture during the past year; in most of them the echinococcus disease was of long standing, and the hydatid sac for the most part of an enormous size. Of these 10, 7 were radically cured by the puncture and 3 died. The autopsy was always made 24 to 30 hours after death, and we became convinced that not a single death was occasioned by the puncture, but would inevitably have taken place without the operation, and most likely sooner. In all 3 autopsies, a firm adhesion was found all round the puncturing wound, between the hydatid sac and the peritoneum, and this was probably the consequence of our always leaving the canula of the trocar in the wound for 48 hours, taking care at the same time to prevent any entrance of air into the sac. In one case the death was occasioned by an old perforation through the diaphragm having produced a gangrenous inflammation in the right lung; and in one other from profuse suppuration in the sac. In all 3 cases a great part of the liver was transformed into a purulent mass like a large hepatic abscess. In the first-named case an echinococcus of the size of a chestnut was found seated on the septum ventriculorum of the heart, and it was remarked that this man had during his life complained of a kind of weakness in the heart; he had for a long time as we say, "felt sick." The echinococci may be found in any tissue of the body, and, although they are most common in the liver and the lungs, they may also be found not only in all internal organs, as the brain and spinal cord, but also in the external organs, as in the mamma and even in the cellular tissue. It is, no doubt, necessary to distinguish the echinococci from serous cysts which also may infest every tissue, and have, no doubt, very often been taken for echinococci. The differential diagnosis of these two very similar diseases can only be properly made out by the aid of the microscope; if, in the fluid of a serous cyst, we can detect no real echinococci or their hooklets, we are not warranted in giving any such cyst the name of echinococcus, but must regard it as a mere cystic tumour, containing a serous fluid, which very often may in every respect have a great likeness to the echinococcus fluid.

It has been pretended that the echinococcus tumours are easily found out by the so-called "*tremblements hydatiques*" of Piorry; this may be in some cases, but there are many hydatid tumours where no such "tremblements" can be elicited by percussion. A kind of fluctuation may sometimes be perceived, especially when the hydatid sac contains a mixture of purulent matter and hydatid fluid; but this is very uncertain, and only occurs in a few cases.

When the hydatid sac is situated on the inferior surface of the liver, the diagnosis of the true nature of the disease is often very difficult and sometimes impossible, until the tumour has grown to such an extent that it is easily felt beneath the anterior margin of the liver.

Endemic Enlargement of the Liver in Men and Sheep in Iceland.

As to the real cause of the hydatid disease in Iceland there are some circumstances worthy of attention, and which in time to come may cast a new light on the pathogeny of this disease. According to my experience there seems to be an endemic enlargement of this organ in our country both in men and animals. This enlargement, or endemic hypertrophy of the liver is most frequent in men and sheep, and it is in men and sheep that the echinococcus disease is so common in Iceland. When I first remarked this, I thought that the hypertrophy of the liver was occasioned by an incipient hydatid disease, but when I found no hydatids in many of the enlarged livers in sheep, I began to suspect that this enlargement was an endemic affection of those domesticated animals, and so it has proved. By having the liver weighed, I have found that in a great number of sheep this organ has nearly double the weight it ought to have according to the general physiological rule. I have observed the same phenomenon in men; but as autopsies are still not so frequent in our country as I could wish, I dare not at present insist upon this fact as a general one, although I feel very much inclined to believe that it is so, from the liver dulness which in many Icelanders has a greater extent than is normal.

I am now pursuing these investigations and shall as soon as possible speak more fully of this strange phenomenon.

Hydrate of Chloral in Hysteria.

As hysterical *agrypny* is very common in this country, I have had occasion to try the hydrate chloral against this affection, and I have found it to act very successfully. In some cases of hypochondriacal sleeplessness it has shown the same good effect.

Remarkable Longevity in the Thingvellir Parish in Iceland.

The parish of Thingvellir, was the seat of the great assembly called "Althing" in our old Republican times. The place has a very romantic situation, and the whole parish is situated on a broad

lava-field, which in prehistoric times flowed from the now extinct large volcano of "Skjaldbreid." The small parish, which only contains about 140 souls, has an elevation of 800 feet above the sea-level, and is situated at the northern end of the large lake of "Thingvellir." The lava-field itself is all overgrown with small birch-trees and wild flowering plants, which during a summer day give some fragrance to the clear and pure mountainous atmosphere; the water in the lava-rents, which are in some places big and deep, is extremely clear and wholesome, and there are also small rivers from the adjacent mountains with very clear water. The lake, one of the largest in Iceland, is full of trout, and the lava-field is a good sporting place. The very favourable salubrious state of this place may best be demonstrated by the yearly mean death-rate, which the following table for this parish may elucidate. It is taken from the ministerial book of the parish by myself, and speaks for itself.

TABLE SHOWING THE DEATH-RATE OF THINGVELLIR FOR 1854—64 (BOTH YEARS INCLUDED).

Year.	Population.	Death rate, age of the dead, and the cause of their death.
1854	134	2, viz., 1 child under 1 year, and an old woman at 86 years.
1855	136	3, viz., 2 children and 1 woman, from hydatids.
1856	135	Not a single death.
1857	137	One child of croup.
1858	136	One man 65 years old, from pleurisy.
1859	136	One man, of elephantiasis.
1860	137	None.
1861	138	None.
1862	138	None.
1863	136	3, viz., 1 child in its first year; 1 man 56 years old, and an old woman of 86, both of influenza.
1864	138	An old woman, 93 years.

From this table it is evident that only 12 persons have died in this parish during 11 years out of a population of 134 to 138 in-

habitants. Four of the dead were children in their first year, and 1 child in the sixth year, of croup; 2 were rather advanced in age of 56 to 65; 2 between 80 and 90; and 1 between 90 and 100. During four of the eleven years not a single death occurred.

During this period the mortality was rather high all over the country, and in some parishes it went up to the enormous amount of 6 per cent. This was occasioned by a very frequent and malignant epidemic of typhus, that raged nearly all over the country in the years 1858—62. In this last year a malignant influenza was followed by a high mortality, which in the whole island was calculated to have been about 2,000 or not far from 2 per cent. of the whole population; but those epidemics did not affect this remarkably salubrious place.

It is a great pity that such a healthy place should be unknown to the world, and not at all taken advantage of by the many suffering people who might greatly profit by it. I know of no place where consumptive patients would be better off than at this healthy abode, and I therefore look upon it as my duty to make it known, and to do everything in my power to try to get a convalescent hospital erected. I feel pretty sure that the experience would soon make it what it deserves to be, viz., an agreeable and most salubrious abode for all weak, depressed, and consumptive patients.

AMERICA (UNITED STATES).

Report by A. S. CARROLL, M.D., *Editor of the New York Medical Gazette (of New York).**

A WIDE field is offered for medical research in America, with its great extent of territory, and its almost infinite diversity of meteorological and telluric conditions; but this field has not as yet been fully cultivated for several reasons. The "magnificent distances" which intervene between different points of observation render it a difficult matter to collate and compare such results as are actually achieved; and, moreover, the hurried system of education, under which most matriculants, with scanty preparation, are in urgent haste to gain a livelihood, and the post-graduate exigencies of daily life in thinly populated districts, tend to produce more practical bread-earners than scientific investigators. Hence, in many parts of the country, a rich harvest of materials, of much value to hygiene, has been hitherto without reapers, and, with the exception of rare and usually insufficient reports from a few scattered points, the climatology of America in its relation to health and disease offers scarcely any data.

In the larger centres, however, the case is different, and many earnest and competent workers are engaged in prosecuting scientific studies; though even here, under republican institutions, where governmental encouragement neither is nor can be given to science, the opportunities for exclusive devotion to such pursuits are necessarily limited, and, in the majority of instances, attention is

* In explanation of the incompleteness of this Report, it is only fair to Dr. Carroll to state that in the midst of preparing it he had the misfortune to be laid up with fever, from which he was barely convalescent when he hastily finished his manuscript and send it off. Also, that Dr. Napheys, of Philadelphia, had undertaken to report on Materia Medica and Therapeutics, and, therefore, this important department was omitted by Dr. Carroll, who wrote to me September 20th, 1870,—"Dr. Napheys will, in person, hand you his Report on Materia Medica and Therapeutics, which will probably be by far the most voluminous document from this side of the water." On September 21st I received a note from Dr. Napheys, written from *Paris*, apprising me of his intended visit; but he was unfortunately detained, and up to the time of going to press with these sheets, neither Dr. Napheys nor his report had arrived. [ED.]

perforce concentrated upon such practical details of therapeutics and surgery, as may be brought to bear directly on the treatment of disease.

This same business necessity it is, perhaps, which renders conspicuous, by their absence, the full reports on various departments of medicine which were in good faith promised to your reporter by gentlemen respectively eminent therein, but, in lieu of which, he has, in most cases, received either no word at all, or an apologetic note at too late a date for him to attempt to supply the deficiency. He may further add that to all his requests to authors for *précis* of their works but three responses were returned.

For the Report on Physiology your reporter is indebted to Dr. W. T. Lusk, Professor of Physiology in the Long Island College Hospital; his own responsibility being limited to such points as the author's modesty had led him to omit.

Morbid Anatomy.

Death by Hanging.—Dr. W. W. Keen, of Philadelphia, reported to the Pathological Society of that city the results of two autopsies made of criminals hanged with a drop of about five feet. In one the hyoid bone was fractured, but in neither case was there fracture of the vertebræ. Dr. Keen thought that an incorrect diagnosis of fracture or displacement might often arise from the existence of the normal depression between the occipital protuberance and the spinous process of the axis, caused by the absence of a spinous process in the atlas.

Extensive Ossification of the Living Tissues.—Dr. W. M. Byers, of Texas, recounts in the "New Orleans Journal of Medicine," January, 1870, the case of a young man who, at the time of his death, "was almost complete bone." At the age of eight months numerous small hard tumours, like boy's marbles, had been noticed by his parents in different parts of his body, causing no pain, and not interfering with his apparent health. As these tumours began to disappear, stiffness of the joints set in, and, at the age of ten years, the hip joints and those of the arms were completely anchylosed. The chest became apparently a sheet of bone, the outlines of the ribs being obliterated, and the ossific process commenced to extend to the muscular tissue. The sterno-mastoids were ossified so as to fix the head immovably, but the muscles of mastication remained unaffected. Digestion was well performed, and the mental faculties were above the average. The

morbid process advanced until movement of any joint became impossible, and the muscles generally, hardened by the deposit, could be felt through the skin which was adherent to them. The patient's growth was arrested at the age of ten, and he never manifested any signs of virility; but he suffered no pain, and maintained intelligence and cheerfulness until his death, at the age of about twenty-one.

Surgery.

Although many brilliant and successful operations have been chronicled during the past year, the number of original devices of any importance has been small. The immediate treatment of fractures by immovable dressings finds daily increasing favour, and has been strongly advocated by Professor D. W. Yandell, of Kentucky, to replace all other apparatus in fractures of the thigh.

Professor E. H. Moore,* of the Buffalo Medical College, describes a new method of reducing Colles' fracture as follows:—

"An assistant holding the forearm of the patient, the surgeon grasps his hand, the right with the right, or *vice versa*. With the other hand placed under the forearm above the fracture, he is enabled to bring the thumb over the back of the ulna, the fingers wrapping around the radius. Traction is first made by extension, then drawing the hand laterally to the radial side, then backward, next keeping it held backward, and while making extension it is swung towards the ulnar side, bending well laterally, when the extension of the hand is changed for flexion, thus describing nearly a semi-circle in circumduction. The position of the hand grasping the forearm undergoes constant change, as it is the antagonist of the other hand in everything but the extension. As the backward position of the hand, when it is carried to the extreme ulnar side, is changed to flexion of the hand, the thumb of the surgeon rolls around the border of the ulna, and is below when the manœuvre is complete. The test of reduction is to be found in the presence of the head of the ulna on the radial side of the ulnar extension."

The dressing consists in a cylindrical compress, about two inches in length, placed along the ulna from the pisiform bone outwards, resting on its radial border against the tendon of the flexor carpi ulnaris. "A band of adhesive plaister of the same width is wrapped firmly round the wrist, and over the compress, extending down-

* "Medical Record," April 1st, 1870.

ward to the extreme point of the radius, thus grasping the bones neatly and tightly." A narrow sling allows the weight of the hand to bear upon the ulna.

Modified Lateral Flaps in Amputation at the Knee.—Dr. Stephen Smith,* of New York, proposes an operation combining the good features of the long anterior and the lateral flaps, without their disadvantages. "The incision is commenced about one inch below the tubercle of the tibia, and carried downwards and forwards over the most prominent part of the side of the leg until it reaches the under surface, when it is curved towards the median line. When that point is reached, it is continued directly upwards to the centre of the articulation. A second incision begins at the same point as the first, and pursues a similar direction on the opposite side of the leg, and meets it in the median line on the posterior part. . . . . The following precautions should be remembered, viz., the incisions should incline moderately forwards down to the curve of the side of the leg, to secure ample covering for the condyles, and that upon the internal aspect should have additional fulness for the purpose of ensuring sufficient flap for the internal condyle of the femur, which is longer and larger than the external. In the dissection, the skin, fascia, and cellular tissue are raised, and the ligamentum patellæ divided, allowing the patella to remain. The ligatures are all drawn out of the posterior angle of the flaps."

This mode of operating is said to offer great advantages, in permitting free drainage from the wound, and in removing the cicatrix from the face of the stump to its posterior part. It has also been used by Dr. Smith upon the thigh and leg.

Pruritus Ani.—Professor W. H. Van Buren† states that in obstinate cases of this affection he has found the condition to depend upon the presence of the tricophyton, and to be promptly relieved by the use of a solution of sulphurous acid, as a parasiticide.

Fistula in Ano.—Professor J. J. Chisolm,‡ of Maryland, replaces all other dressings after incision of anal fistula, by painting the surfaces of the wound with the liquid persulphate or perchloride of iron, with three objects in view:—

* "American Journal of the Medical Sciences," January, 1870.

† "New York Medical Gazette," March 12th, 1870.

‡ "Baltimore Medical Journal," February, 1870.

1. To cauterise the surfaces and prevent agglutination of the newly-cut walls.

2. To arrest hæmorrhage.

3. To clot the blood in the wound, and oppose this physical barrier to the approximation of the surfaces.

No further local treatment is required, and in ordinary cases the patient need not be confined to the house.

Electrolysis in a Malignant Tumour.—Dr. W. B. Neftel,* of New York, performed electrolysis in a scirrhous tumour, the size of an orange, in the right mammary region of a male patient, aged 58, from whom a similar growth on the left side had been removed a year previously. The operation was thrice repeated at intervals of a few days, and in ten weeks afterwards the tumour had entirely disappeared, the patient remaining free from any fresh deposit at the date of the report some weeks later.

Physiology.

On the Action of Inhalations of Pure Oxygen upon the Blood. By Dr. Andrew H. Smith.

Dr. A. H. Smith in his paper entitled "Oxygen in Disease," † shows by a series of experiments:—

1. That the power of the blood to absorb oxygen is limited, and that saturation of the blood with oxygen may be a physiological condition under circumstances of great muscular effort. When artificially induced, such saturation does not necessarily involve the setting up of any pathological process. Dr. Smith kept an animal four days in pure oxygen gas, without any apparent injury, the constant purity of the gas being secured by the most careful provisions for the removal of the products of respiration.

2. That the primary effect of the inhalation of a considerable quantity of oxygen is to diminish the quantity of carbonic acid exhaled, and to reduce the temperature of the body.

3. That the ultimate effect of such inhalation is to increase slightly the activity of the nutritive changes, as shown by an increase of carbonic acid exhaled, and increased assimilation of food.

Dr. Smith found, in some experiments upon his own person, that the quantity of urea was diminished by the inhalation of oxygen gas, and suggests that this may be due to its more perfect

* "Medical Record," August, 1869.

† "New York Medical Journal," April, 1870.

oxydation, in which case urea would be analogous to smoke resulting from combustion, a product, indeed, of combustion, but, at the same time, a measure of the incompleteness of the process.

On the Microscopical Anatomy of the Human Liver. By Dr. H. D. Schmidt.*

Dr. Schmidt's labours, of which the present paper is the fruit, were completed in the year 1859. Already, in the January number of the "American Journal of Medical Sciences" of that year, Dr. Schmidt had published an article on the "Hepatic Lobule," in which he described the origin of the bile ducts in a capillary plexus within the lobule, thus anticipating the later discoveries of Budge and others. The extended researches contained in the present paper were completed in 1859, their publication, however, was delayed by the Civil War, and afterward by the burning of his manuscripts in the fire at the Smithsonian Institute at Washington, where they had been deposited for publication. Dr. Schmidt's injections were made by means of an apparatus so arranged that while the organ is placed in a vacuum, the pressure is exerted by the weight of the fluid to be injected. Another apparatus enabled him to make extremely fine sections with great rapidity. In this way he was able to demonstrate the walls of the bile capillaries within the lobules. His injections prove further—the origin of minute lymphatics in the net-work of the bile capillaries; that there are lymphatics which directly join small hepatic ducts; that a system of small follicular and racemose glands forms extensive plexuses throughout the liver; and that a communication exists between the ducts of these glands and lymphatic vessels. Dr. Schmidt regards the discovery of a natural communication between the hepatic ducts and lymphatics of the liver, of great importance in explaining the phenomena of jaundice, as, for instance, its rarity in diseases of the parenchyma of the liver, and its almost constant presence in those of the biliary ducts.

On the Glycogenic Function of the Liver—"Origin of Diabetes," by W. T. Lusk, M.D.†

Dr. Lusk confirmed the familiar experiments of Dr. Pavy, showing absence of sugar in the tissue of perfectly fresh liver, the unexpectedly small amount of sugar in the blood withdrawn from

* "New Orleans Journal of Medicine," October, 1869.

† "New York Medical Journal," July, 1870.

the right side of the heart of a living animal, and the invariable presence of traces of sugar in blood taken indiscriminately from different parts of the body.

Dr. Lusk shows, however, that Pavy's supposition that these traces are everywhere identical in amount, is incorrect. Indeed, it can be shown that the sugar in the blood from the right side of the heart, insignificant as it appears to be, is still largely in excess of that obtained from the arterial and general venous systems. This fact may be shown by extracting the sugar contained in equal quantities of blood, taken during life from the right side of the heart and from the jugular vein. For instance, redissolving each saccharine extract in the same quantity of water, and then adding the same amount of each to a given quantity of Fehling's test solution, upon boiling, there is a marked difference presented to the eye in the extent of the two reactions. Indeed, while the reduction of the copper test in the case of the blood from the right side of the heart would be nearly complete, in that from the jugular vein the reaction would frequently be scarcely perceptible until the liquid had cooled. To be sure that the result was not due to accident, two specimens of the same blood were prepared in the same way, but it was found that there was nothing either in the vivacity of the reaction, or in the amount of the precipitate to distinguish them one from the other. These experiments were repeated in a number of instances, and were conducted with the utmost care. Every precaution was taken to avoid disturbing the strictly physiological conditions of the animal subjected to experimentation.

As a result of his experiments Dr. Lusk adopts the following conclusions:—

1. That the blood of the general system in carnivorous animals confined to a nitrogenous diet, contains an appreciable amount of glycose, not only during the period of digestion, as admitted by Bernard, but even in cases where animals have been deprived of food for a considerable period of time.

2. That the blood of the right side of the heart contains from a quarter to a half of a fluid grain of sugar per fluid ounce, under strictly physiological conditions.

3. That the quantity of glycose in the right side of the heart is from two to four times greater than that found, under corresponding circumstances, in the jugular vein.

4. That this excess argues a by no means insignificant amount of sugar in the pure hepatic blood before it has become largely diluted with the non-saccharine fluids of the venæ cavæ.

5. That we are forced to admit the fact of sugar-formation by the liver, though we fail to detect the presence of sugar in the liver tissue, when, after death, the fermentation of the glycogenic matter is prevented.

Reflex Contraction of Blood-vessels. By JAMES J. PUTNAM.*

Dr. Putnam presents the results of his experiments on the reflex action of irritants, upon the circulation of frogs in which the medulla had been destroyed. Watching the blood-current in the web of one foot under the microscope, Dr. Putnam found that there followed contraction of the arteries and slowing of the circulation when ammonia was applied to the other foot.

The action of cold was marked only in a single instance, when the application of ice was followed by a remarkable slowing of the circulation, and, finally by a complete stasis of the same. When cold was applied to the thigh of the same leg, there was marked acceleration of the circulation in the foot of the opposite leg. In every case in which the action of the heart was observed, this was either found unchanged or accelerated.

Dr. Putnam found that if he placed the bulb of a thermometer in the fold of one ear of a rabbit, while the other ear was surrounded by pieces of ice, the mercury would generally fall from ½° to 4° Fahr. After remaining at the new level from a few seconds to four or five minutes, the mercury would then rise to the extent of 15° to 25°, the ice being still kept in contact with the opposite ear, and, at this time, the arteries could be seen and felt to be greatly enlarged.

Galvanization of the Cervical Sympathetic.

In a paper entitled "Spinal Irritation,"† Dr. W. A. Hammond states that excitation of the sympathetic, which may be obtained by passing the galvanic current through that portion of the spinal cord situated between the seventh cervical and sixth dorsal vertebræ, causes contraction of the vessels of the brain, as can be readily seen by ophthalmoscopic examination while the current is passing.

Dr. A. D. Rockwill, in the July number of the same Journal ("On Galvanization of the Sympathetic Nerve"), furnishes additional evidence of this fact.

* "Boston Medical and Surgical Journal," June 23rd, 1870.

† "Journal of Psychological Medicine."

Dermatology.

Dermatology in America can claim very little in the way of progress or original investigation; but during the last few years it has obtained a very general recognition as a distinct field for scientific research, and to its cultivation some of our ablest young men are devoting their attention. The seed has been planted, and assisted by the cordial support of the general profession, may soon germinate and bring forth worthy fruit.

In all of the principal colleges lectures and weekly clinics are devoted to the consideration of diseases of the skin, and the attention accorded them by students is an earnest of the future prospects of this branch.

The affections met with are the same that are familiar in England, neither the climate nor the habits of our people having, as yet, developed any that can be considered peculiar to America. The syphilitic and scrofulous affections (judging however from somewhat imperfect statistics) are probably not as prevalent as in England, though undoubtedly upon the increase. Of the comparative prevalence of the other diathetic affections of the skin it would be impossible to form a reliable estimate.

Leprosy, of which we have heretofore seen but a few exotic examples, bids fair to become endemic, radiating from two principal foci, namely, the Chinese in California, and the Norwegians in Wisconsin.

The past year has given us but one original contribution to the literature of dermatology, namely, Damon's "Structural Lesions of the Skin," in which the author associates all those affections the principal element of which is hypertrophy, atrophy, or a pathological new formation. A series of photographs of interesting cases of skin disease has also been published in Boston, under the auspices of Dr. Damon.

A quarterly periodical devoted to syphilography and dermatology, edited by Dr. Henry, of New York, has made its appearance, and is receiving much encouragement from the profession. Its last number (July, 1870) contains a description of a new instrument, termed the "Cutisector," devised by Dr. Piffard, of New York, the object of which is to facilitate the study of cutaneous pathology. It consists of two parallel blades, about half an inch in length, with the handle at nearly a right angle instead of on a line with the blades. By the aid of this knife thin perpendicular sections of morbid integument may be easily

obtained from the living subject for microscopical investigation. The employment of this instrument cannot fail to throw light upon many obscure questions in cutaneous pathology, and ultimately prove useful for diagnostic purposes.

A dispensary for the exclusive treatment of diseases of the skin has been opened during the past year in New York, the only one of the kind in America.

CHINA.

Report by F. PORTER SMITH, M.B. Lond. (*of Hankow*).

I REGRET that the following short note is all I am able to send this year, as I am just leaving China, and my Sixth Annual Report of the "Wesleyan Medical Mission for June, 1869, to June, 1870," which ought to have been out by this time, is not yet ready. As soon as it is printed I will send it. Dr. Jamieson, of Shanghai, should report for you next year.

THE CHINESE NATIONAL MEDICAL ORGANISATION.

The medical system of China is like a pennypiece, it has a head and a tail, both very plainly superscribed, with a heavy, thick mass between them—the substantial support of both—not worthy of the name of a body. There is, on the one hand, the great medical college at Peking, which is really the office of Imperial physician put into commission; and, on the other, the profitable calling of the druggist, whose shop is always the smartest in the street, exercised all over the empire with much dignity and more profit. Between these two terminal points, of not very elevated position, there is a long line of disorderly representatives of the "noblest of professions," who practise upon the people of China "the vilest of trades." These ignorant, mercenary practitioners divide themselves into the "Literary," the "Hereditary," and the "Knowing" doctors.

There are as many as thirteen specialities of practice allowed by the Peking College of Physicians, as it is called by some; but the departments of external (surgery), internal (medicine), ophthalmic, female, infantile, and small-pox practice, are the most frequent divisions of the medical function, leaving out the travelling quacks.

There is also a division, recognised by that excellent digest of law, the Tartar code, into the "ordinary" or general practitioner, and the "notable" or physician. There are midwives who have the sense to confine themselves to their plain duties of "receiving the

born," as their name signifies in the Chinese vernacular. There is no teaching or training, or any qualification but presumption, required of those who essay to heal the sick man in China. A bundle of prescriptions, and the hereditary possession of secret and empirical methods, are the surest grounds of success in the medical line, in populous and credulous China. The power of looking grave over the dignified operation of "regarding the pulse," as they call it, combined with the plentiful use of terms drawn from the dual philosophy of the *Ying* and the *Yang*, are important accomplishments.

Any foreign student who devotes his leisure to a brief study of the pharmacology, which is the great branch of their medical literature, may puzzle the wisestacre of the whole lot of Chinese doctors. And yet it would be very unwise, unkind, and untrue to say that these men, ignorant of the correct anatomy of the body, to say nothing of other sciences, are altogether without availing themselves of the splendid resources of a varying climate, and a vast country, which provide a copious materia medica; they secure the relief or euthanasia of many of their faithful patients. Chary in the use of mineral and metallic preparations, which they nevertheless know how to prepare with some skill, they stick to the safer remedies of the vegetable kingdom, which rules so royally over all their empire. Cautious, like all Oriental peoples, in invading the mortal territories of the human system, they bring to bear all their force upon the safe surface of the body, which they pierce with needles, burn with lamps and moxas, and scarify with rude cupping instruments. Some few are bold enough to use the dreaded knife, and bleeding, incision of abscesses, and removal of growths, have been known to be attempted with some deserved success. Malpractice is provided against by the Tartar Code, which inflicts temporary, or perpetual prohibition from practice, upon the finding of such a verdict by medical assessors. Instances of vexatious actions at law against bold and enlightened practitioners who have been unsuccessful in their departure from routine have come under the writer's notice. Veterinary doctors have been in existence for 3000 years in China, and they possess a formal literature. We even hear of statistics of cattle plagues being kept at that early period. As to the public medical service, there are doctors attached to the staff of general officers, but no regimental appointments. There is a medical mandarin of the ninth rank, connected with each prefecture, and another of still lower grade, connected with each district-city. These are a sort of medical tutors, who often undertake, in addition, the medical

charge of the jails, or they are locked up with the students in their protracted triennial examinations. The oldest medical works were written by the early monarchs, *Shin-nung* and *Hevang Ti*, of alarming antiquity. The best work on Chinese medicine is the "Pun Tsau Kang Muh," a work in fifty-two volumes, with three volumes of plates. This is, however, above the comprehension of the present race of practitioners. It was written by *Li-Shi-chin*, a district magistrate. A portion of its contents will shortly appear in a small work on the Chinese Materia Medica, by the writer of this brief notice.

JAVA AND MADURA.

(FORMING THE NETHERLANDS-INDIA.)

Report by J. R. WYLIE, M.D., M.C., *Registered Medical Practitioner of Batavia.**

ANATOMY—NORMAL.

The inhabitants of this country are—

1. Javanese.
2. Malays.
3. Madurese.
4. Chino-Malays.
5. Half-Castes.
6. Europeans.
7. Arabs and Africans.

These are arranged according to their numbers, the Javanese being greatest in number, and the others decreasing down to the Arabs and Africans, who are represented by very few.

No. 1. Very well formed, muscular, tall, olive-coloured skin, male and female wear very long hair—from two to four feet long; Grecian features.

No. 2. Short and thick set, muscular, ugly and large boned, skin darker than No. 1; female wears long hair; male shaves head and wears a calico cloth on it.

No. 3. Very like No. 2, only difference being that Madurese male wears long hair like No. 1.

* [Extract from a Letter accompanying Dr. Wylie's Report.]

"Accompanying this letter is the packet containing my report for the past year, and although still imperfect, I trust it may be to some extent more useful and satisfactory than my last. I have resolved to remove to another field, viz., Melbourne, Australia. I may mention that three or four years ago the English community in Batavia was in great force, but in consequence of commercial failures and retirements from business it has dwindled down to insignificance.

"I hope to be in Melbourne in two months from this date, and if I can be of any use to you there, my services are at your command.

"In order to improve my knowledge of Java before leaving it, I have made a tour of the whole country during the last two months, and having returned only a few days ago to Batavia, I trust this will be sufficient excuse for the delay which has occurred in the transmission of my present very imperfect report.

"I intend shortly to put my practical experience of the past four years in Java into a printed form. You may attach this letter to my Report."

No. 4. Well developed, partakes chiefly of Malay features and body, but adopts the habits and dress of the Chinese.

No. 5. A very ugly cross between Dutch and Malay, slenderly built, weak in body and often in mind, small in stature, features Malay, habits Malay, dress European.

No. 6. Europeans, the Dutch are short, fat and well developed; males wear hair closely cropped.

No. 7. Very few in number, degenerated specimens of their countrymen in Arabia and Africa.

Morbid Anatomy.

During my three-and-a-half years' residence I have seen many blind Malays, a few Javanese dwarfs, one Malay born without arms, another with only one leg. Goître is very common among the Malay women. Large venous and fatty tumours are also frequently met with, about the head, face, and neck. Considering the carelessness with which children are reared here by the Native population, I am amazed at the total absence of "bow legs."

In Solo I have seen a male dwarf 57 years of age; he is four feet and half-an-inch in height, stout and healthy; has a daughter whom I have also seen; she is 30 years of age and only three feet eight inches in height, perfectly formed, and in good health. They are both active, and hold the rank of household servants to the Emperor of Solo. The dwarf told me there were many others as small as himself in the emperor's service, and also that his family have been dwarfs in several generations.

Physiology.

From observations made during the past three years and-a-half I conclude that in Java the *Heart* becomes very sluggish in its action.

Bowels, except in disease, perform their functions very regularly and actively.

Sudorific functions, are very actively performed in the European on the slightest exertion, and quite the reverse in the case of the native and half-caste population.

Nervous system is highly excited here.

Uterine functions.—At a very early age, in the European born here and in the native, completely developed—as early as twelve years of age. The half-caste and European full grown female is very subject to uterine derangements, such as menorrhagia and dysmenorrhœa, and less frequently to other affections to which the

uterine functions are liable. I may add that barrenness is very prevalent among the half-castes.

Male organs of generation are very highly developed here; the strong venereal appetite leads often to such excesses that impotence is the result at a very early age. This applies to natives and Europeans. In this country nearly all Europeans who are not married keep a native mistress, or make use (and frequently) of the public native women. The soldiers of the Dutch Indian Army are all allowed to keep a native woman, and I can testify that these soldiers seem in good bodily condition. I have met with several cases where the venereal passion has been resisted, and in all these instances the body is weak and emaciated and the general system in a bad condition. I infer from what has passed before my notice, in this and other hot climates, that the venereal appetite is very strong, so strong indeed as to require satisfaction to no small extent. When asked by young men, "What am I to do, doctor?" I say, "Get married." "But I cannot afford that." I still answer, "Get married," and from this they know what is necessary, and I leave it to themselves to solve the moral difficulty. I will not here dilate further on this subject, falsely called "delicate" by some, but which I think ought to be openly and honestly handled by the profession, and more especially by professors to their pupils. I think I never heard this subject even mentioned, much less lectured on during the whole course of my medical studies, and this is very unfortunate for the young doctor afterwards.

Chemistry.

Cocoa-nut Oil Soap is manufactured in two factories in Java. It is used extensively here by Europeans, not by natives. The latter prefer a common and very inferior yellow manufactured soap from England. It is less than two years since this manufacture was begun.

Arack is also made in Java.

Vinegar is also extensively made here, but only lately.

Etiology.

Fever is caused by want of drainage, the low flat marshy nature of the land on which all the important towns in Java are built, bad sanitary arrangement of the houses, and excessive heat at one time and heavy rains at another. Nearly all the houses are in close proximity with the stables, privies, wells and kitchens, and, horrible but true, the wells are within a few feet of the privies, and the

latter consist simply of a hole dug in the ground, and a small house built over it, there being no outlet for the filth, and they are never emptied, the necessary consequence being that the neighbouring wells must be more or less affected by the neighbouring filth. To this arrangement may be attributed many of the fevers and bowel complaints which are met with.

Venereal diseases seem to be caused by the same circumstances as exist in other countries, promiscuous connexion being first.

Cholera, which is never absent from many parts of the country, more especially the towns, is ascribed by the faculty here to the malarious nature of the country where it exists, the want of drainage, the accumulation of filth in the vicinity of the houses, and, amongst the natives, to the unwholesome food which is eaten, more especially fish and vegetables.

With regard to other diseases found here, I think the causes are much the same as in other tropical climates.

Hygiene.

Diet among *Europeans* consists of—

Breakfast (8 a.m.)—Boiled eggs, bread, raw ham, cheese, sausages, coffee or tea, and fruit, more especially pesangs (bananas) and oranges.

Lunch (12).—Cold meat, rice and curry, fruit, iced water or beer, and red wine.

Dinner (7).—Soup, beef steak, roast beef, pork roast or boiled, potatoes, sweets, cheese, fruit, beer and wine, or iced water. Only the English and Arabs eat mutton.

An hour after *tea*, coffee and cigars.

Diet.—Amongst the *native* population, rice and fish, with vegetables cooked or uncooked, fruit and water, and hot spices. Chinese eat the same, but in addition drink much tea.

Regimen.—The Europeans are given to the habit of drinking gin and bitters before each meal,—amongst the Dutch. The English indulge in sherry before meals, champagne to dinner (this extensively), and very commonly brandy and soda during the evening up till bedtime, and they keep pretty late hours.

Natives eat and sleep at any hour of the day or night, there being no regularity in their habits.

Bath.—Europeans and natives indulge in a cold bath daily, the former in bath rooms, and the latter in rivers, canals, and pools, generally in the morning, but some bathe morning and evening; men, women, and children all enjoy their baths.

Clothing.—Europeans dress lightly, wearing in the morning until bathing time the clothes they have slept in, consisting of a loose calico jacket coming to the waist in males and a longer calico jacket in females; the nether garment in the male is a pair of calico or coloured print drawers very loose about the legs; in the female the nether garment is called a "sarong," and is simply a bag open at both ends, one end being lightly fastened round the waist, the other loose and about the feet.

Males dress entirely in white clothes at business, and only wear cloth garments when the heavy rains last, or on dress occasions.

Females wear their sleeping dress the whole day, excepting at dinner, when they adorn their persons with European costumes; but after dinner they generally resume the unsightly sleeping dress—this may be the reason why European ladies here, as a rule, have awkward, loose and ungraceful figures.

The *natives* (male) wear a handkerchief on the head, a thin print jacket covering the body down to the waist, and a pair of print drawers, very wide, and no covering for the feet. Females have long hair but no covering to the head, and this forms the only distinction visible between a male and female native, the clothes are the same as the sleeping costumes of the European female. A curious custom here enables one to distinguish a European and native female; the former always wears the upper garment of white calico; the native wears the upper garment of coloured print, unless she be the mistress of a European. European children wear an overall garment of coloured print or calico; the native child until two years of age runs about naked.

Prevention of Diseases.

The means taken here for preventing disease are few indeed. No drainage system is carried out, consequently there are abundant facilities for the production and spread of disease.

Small pox occurring here during the rainy season is pretty well checked by vaccination.

Vaccination.—This colony is managed by the Dutch in an essentially paternal manner, I have often thought rather too much so; but their policy has enabled them to hold the country now for a very long time, so I suppose it has been on the whole successful. As regards vaccination it is compulsory among the natives, but not among the Chinese and Europeans, but I am glad to say the latter carry out vaccination most satisfactorily. The Chinese, however, adopt their own peculiar method of proceeding, which I will shortly

describe. The Dutch Indian Government have public vaccinators appointed in every town in the country, who attend two days every week. These officers—who by the way are intelligent natives—go to the public fairs or markets, and vaccinate every native child presented to them, and I must say the natives are thoroughly imbued with the beneficial effects of vaccination, and always come forward most readily. The Europeans send for this vaccinator whenever they want him, and he brings with him a woman with a child which has been vaccinated seven days previously, and transfers the matter directly from the one child to the other. The vaccinator generally punctures each arm in three places, so that operation seldom fails. The natives do not pay anything for their children being vaccinated, and the Europeans pay a trifle, say the equivalent of (3f.) three shillings to the woman who brings the already vaccinated child.

It is a notorious fact that small pox is chiefly found amongst Europeans; I presume because vaccination is not compulsory among them. When variola occurs among natives, they generally die, because on the eighth day they get up and bathe in the rivers, and death ensues in a few days: where they are prevented from bathing they almost always recover.

Small pox, as a rule, is very mild when occurring in Europeans, the confluent form seldom appearing, and in nearly all cases little or no trace of the disease is left, and a fatal termination is never looked for. Amongst natives the pitting left behind is generally very marked, and the cause of this I cannot undertake to explain in any other way than that, whereas the disease assumes the mildest form in the European, and the confluent form in the native, no measures are taken here to prevent pitting. The disease runs the course so well known by the profession in all countries.

The Chinese vaccinate in a different manner to that adopted by Europeans; they get a dry crust off a pustule from a person just recovering from the disease. This crust is ground into a powder, and this powder is snuffed up the nostrils of the person to be affected, if a grown up person; but when the subject is a child, the powder is injected into the nostrils by means of an air syringe; the results of this method are very unsatisfactory; the disease itself appears in due time in all its virulence; the mortality is very great, although I am quite unable to give statistics on this point on account of the insuperable obstacles in the way of investigation, especially to an Englishman. I may mention I have the greatest difficulty in getting even the few statistics which are in this very imperfect report. In nearly all cases small pox assumes the con-

fluent, and occasionally the hæmorrhagic, form; the former leaving deep and ugly pitting, the latter always terminating fatally. Blindness and deafness seldom result here from this disease.

No register of vaccination is kept here, and there is great room for improvement in its administration. The Dutch are proverbially slow in everything, and sanitary affairs are almost ignored.

I would add here that I have only seen the hæmorrhagic form of the disease twice during my three-and-a-half years' practice, and both instances were in Chinese females.

Cholera.—I am sorry to say that since last year's report nothing has been done to investigate the circumstances causing this disease. It is lamentable for the sake of humanity to think that so little is thought of this disease, and much might be done to lessen, if not eradicate it from these lands; but as it is, it is now one of the permanent scourges and institutions of the country. Had I any chance of co-operation and support I would willingly do my utmost to investigate, but unfortunately I am an Englishman, and as there are no other English doctors in this country I cannot get support from any quarter.

Leprosy, or Lepra Tuberculosa.

This, as Dr. Tilbury Fox remarks in the report for 1869, is the disease in its tubercular aspect. The subjects of this disease are kept at the public expense; formerly the opinion prevailed that leprosy was contagious, and the patients were confined entirely to special houses, but now contagion is disbelieved in, and they are allowed to go where they feel inclined, and leave whenever they desire to do so. These houses are chiefly in the Moluccas, and the disease is never met with in Java proper. (*See* paragraph on Hospitals.)

Venereal Disease.

Prostitution is an infamous trade carried on entirely by native women, no European prostitutes being permitted here, a fact worthy of serious consideration by all who are interested in the pros and cons of the new "Contagious Diseases Act." The reason usually given for this prohibition of European prostitution is, that the Dutch Government do not wish the European to be degraded in the native mind as would be otherwise the case. So stringently is this government law carried out, that a few years ago, when an English prostitute landed in Batavia from Australia she was immediately arrested and marched off under a military escort to a

steamer and sent off to Singapore, and since that time no more such importations into this country have been attempted. As above mentioned, prostitution is carried on entirely by the native women, and this under government control, in the following manner:—In different parts of every town where Europeans and Chinese are resident, houses are built in a barrack-like form with slight wooden divisions between each bed, and here all known prostitutes are compelled to confine themselves. All male persons who wish to engage prostitutes must go there and pay a sum of money to the controller of the establishment, and he then may take his choice of the women inside. When these women once enter the trade, they are actually compelled to remain in these establishments for one or two years. A man who may wish to take one of these women out for a day may do so, but must return her to the establishment at night. When these poor creatures become diseased, they are at once sent to a Lock hospital, where they are treated by the government medical officer (who has this among other duties to perform), and when they are cured (?) they are returned to the prostitute establishment for further use, and so on until their time is expired. I have never heard of any attempt being made to rescue them from this cruel life.

These establishments are patronised by sailors from the navy, by merchantmen, and by strangers to the place. Nearly all the soldiers have native mistresses, and consequently seldom, if ever, go to these places.

Disease is rare among the soldiers as compared with sailors; the cause may be evident from the above-mentioned facts.

Natives seldom suffer from venereal disease.

Chinese suffer very much. I think because they are less faithful to their wives than the natives, and they are not so cleanly in their personal habits as the natives.

There is a Lock hospital in every place where there is a prostitute establishment, and a government medical officer visits the former daily.

Meteorology and Climatology.

In Java every range of temperature can be found from extreme cold to extreme heat, dry and warm, moist and cold—every climate can be reached. Bleak, high, and rugged mountains, and extensive warm, luxuriant plains follow each other as we start from Batavia, and travel to the opposite extremity of the island of Java.

Batavia, Samarang, and Soerabaya, the principal towns in the

Dutch East Indies, are alike in nearly every respect, and the description of one applies to all. I shall, therefore, describe more particularly Batavia. It is built on a marsh and very flat adjacent land, and is approached from the sea by a small shallow muddy canal, which, by means of break-water dykes, extending far into the sea on either side, preserves only sufficient water to enable small passenger boats, and flat-bottomed "cargo-prauws" to go up and down; and this miserable canal is one of the principal outlets of the filth of Batavia.

During the months of January, February, and March we have heavy and nearly constant rains, with much thunder and lightning, the temperature being respectively for the three months:—

	Jan.	Feb.	Mar.
Maximum . . .	75°	79°	83°,
Minimum . . .	57°	60°	62°.

These are as closely as I can make them to the truth, from daily observation in the shade.

The mornings are cool and bracing, the evenings damp and foggy.

The diseases prevailing in these months are small-pox, fever, and dysentery.

In April the rains decrease in frequency and amount, and towards the beginning of May the dry weather has set in, and June brings dry weather, and pretty cool winds with it. The temperature:—

	Ap.	May	June
Maximum . . .	85°	87°	89°,
Minimum . . .	81°	79°	78°.

The diseases most prevalent during the second quarter are dysentery, diarrhœa, catarrhal affections, fever, and, towards the end of June, cholera.

In July, August, and September, dry and hot weather, with occasional showers of rain; in September, especially, the rains are heavy with thunder and lightning. Temperature:—

	July	Aug.	Sept.
Maximum . . .	89°	89°	87°,
Minimum . . .	78°	79°	78°.

The diseases prevalent during this quarter are diarrhœa, dysentery, fever, and cholera. Prickly heat is very strong during this quarter, also.

During October, November, and December, cold winds, and

heavy thunder-storms prevail, at first occasionally, and then more regularly, and with more severity until in the last month the wet season is set in.

This quarter's temperature is as follows:—

	Oct.	Nov.	Dec.
Maximum . . .	85°	80°	75°,
Minimum . . .	69°	65°	60°.

This is the healthiest quarter of the year, though fever and diarrhœa are to be found.

Diagnosis.

Under this head I do not find it necessary to make many remarks, as in this country there is nothing in the diagnosis of disease, which is not already known to the profession; on the contrary, I think the confusion caused here in many serious cases can be attributed only to inferior judgment on the part of those who ought to be better qualified for the practice of the medical profession.

Management and Treatment of Disease.

Under this head I will only slightly refer to the following diseases:—

1. Fever.
2. Small-pox.
3. Diarrhœa.
4. Dysentery.
5. Cholera.
6. Venereal diseases.

Fever.—The ordinary remittent type is what we find here amongst all classes of people and nationalities.

Quinine, iron and quinine, arsenic, with calomel, opium, and camphor, are the medicines chiefly employed in the treatment. When the patient is seen early, he is cleared out by an active purge; when there is great cerebral congestion, leeches are applied; appropriate diet is prescribed for the condition of the patient at the time, as far as possible. Quinine is still the prince of remedies for fever, but its administration requires the greatest care and discrimination on the part of the physician.

Small-pox.—I can only mention my own experience here, and it is, that those patients who are least interfered with get on best. Attention on the physician's part is always necessary, however, to the ventilation, clothing, diet, condition of the bowels, removal of irritation, and prevention of contagion.

Diarrhœa—which is here generally a secondary complaint, is treated by farinaceous diet, recumbent posture, emollients, astringents; and often works its own cure if diet and rest are attended to. I have been very partial to the use of catechu, chalk mixtures, gum, and chlorodyne, in ordinary cases, and opium and nitrate of silver, and opium and sulphate of copper in obstinate ones, and with very fair success.

Dysentery.—Since last year I have almost entirely adopted the ipecacuanha treatment, and with the most satisfactory results. I adopt the method recommended by Sir James Ranald Martin, perhaps slightly differing as to quantity, but in no other respect. First, I have the rectum washed out by a luke-warm water enema; secondly, I apply a large mustard and hot rice poultice on the whole of the front of the body, from the neck to the groin, and spreading from side to side, and I simultaneously inject rather more than one drachm of pure laudanum into the rectum. I recommend perfect rest for half-an-hour, and then remove the poultice; recommend retention of the laudanum, and then administer one drachm, or a little more, say to a drachm and a-half, in a wine-glass of iced water. The results of this treatment have been such as to highly please me, even in cases where, at first sight, treatment seemed out of the question. Meanwhile, the diet for several days I prescribe is milk and boiled arrowroot in small but frequent quantities. On the third or fourth day after the ipecacuanha has been administered, I give a very small dose of castor-oil, and enjoin great discrimination in the diet for some time after, removal to the country, etc.

Cholera.—Since last year's Report I have attended twenty-two cases, consisting of twenty-one Chinese, and one European, nineteen females, one European, and two Chinese males.

I have tried various treatments, in fact every newly invented plan has received a trial, but everything as yet tried seems useless. In early cases I have given the following:—

℞.	Chloroform	♏xxx.
	Tinct. opii	♏xxx.
	Spirit.	ʒi.

This taken at a single draught.

An hour after, or less, I have ordered an ounce of the following to be taken, and repeated every hour:—

℞.	Potass. chlorat.	ʒi.
	Acid. hydrochloric. fort. .	♏viii.
	Acid. nitric. dil.	ʒiss.
	Aquæ	℥xxiv.

And this I have found as useful as any other treatment, after vomiting and purging have set in. These symptoms have been almost instantly checked, but if the consecutive fever set in, I have invariably found all measures perfectly useless.

Out of the twenty-two cases, nine died, and I am not bold enough to say that the others recovered from this treatment, because the fatal cases seemed as favourable as those which recovered, and were similarly treated. I have always permitted water to be drunk *ad lib.*, and mustard applications to the abdomen, soles of the feet and hands. My impression is, that many of the cases set down as cholera, when seen in the beginning, are amenable to what is known as the "rational treatment." The long looked-for cure for cholera has not yet appeared, and until it does I fear we must plod on in the same hopeless and unsatisfactory manner, doing our humble best to fight the worst of all diseases.

Syphilis has its field here, and a very extensive one, too; but I think a little progress, though a very little indeed, has been made here in regard to treatment.

As already stated, all women suffering from venereal disease are sent to, and treated at, the Government Lock Hospital; all males are treated at the Government or Military Hospital. The progress I refer to is the evident desire on the part of the younger members of the faculty here to adopt the new treatments now carried on in Europe, as iodide of potassium, etc.; I can only say that the iodide has been extensively tried, and, as compared with the old plans, has been markedly successful. As yet the mercurial vapour bath treatment has been carried out only by myself in syphilis, and, as far as my experience goes, with very great success. But, in spite of this, my Dutch colleagues refuse to try it, one reason being that it is very troublesome; but the benefits obtained quite compensate for all the trouble.

I shall on another occasion, and in a different form give the results of my experience, a "report" not being suitable for details.

Materia Medica.

There is a vessicant employed here, which is a good substitute for Spanish fly, and of which I have never before heard mention made.

Also a seed has lately gained a good reputation in the treatment of dysentery.

Both these medicines will be fully described in my forthcoming volume on the diseases, etc., of this part of the world.

Pharmacy.

We have five apothecaries in Batavia, and in every town of importance in Dutch India there is one apothecary or more, and where there are no civil there are military dispensaries. As nearly all the medicine here is imported from Europe, ready prepared, there is little for the apothecary to do, except to preserve it from the deleterious influences of the climate, and dispense it; the former is best done in glass-stoppered bottles rendered air-tight.

The dispensing in too many instances is so slovenlily done, that great danger is caused, and failure in the treatment of disease.

As an English doctor I am affected by the difference of strength of many medical preparations in the Dutch and British Pharmacopœias.

Descriptions of Mechanical Appliances, Instruments, and Inventions.

From what I have seen the mechanical appliances and instruments used here are far behind the age, old-fashioned and clumsy; inventions there are none. The faculty seems contented with remaining stationary, the majority belonging to the old school.

Hospitals, Infirmaries, and Dispensaries.

In each of the three principal towns of Dutch India, viz., Batavia, Samarang, and Soerabaya there is a large military hospital, a convict establishment (native) with Lock hospital attached, a Chinese hospital, and an infirmary or asylum for the aged and infirm Europeans and half-castes. In Batavia I instituted a free dispensary for diseases of the ear, for the poor, and carried it on for eight months, ending June this year, but was compelled to give it up, although the average number of patients weekly was fifteen, for want of public support, and the exorbitant charges made by the apothecaries for medicine required.

The military hospitals are used by civilians, who must pay according to a regulated scale, 1st class, 2nd, and 3rd per diem (only military doctors are permitted hospital practice, private practitioners have no chance of it). They are very imperfectly ventilated, but in other respects pretty fair.

The Chinese and native hospitals are only attended by one doctor, the former by the first government and the latter by the second or third government doctors. The treatment these Asiatics

are subjected to is rather careless, and, sometimes, what I should call cruel, and they are very inefficiently attended to. But how can it be otherwise when, excepting for ten or fifteen minutes when the medical officers pay a hurried visit, there is no medical aid to be had nearer than three miles, and there is no resident qualified person? There are eight "leper" hospitals in various parts of the Netherlands-India, though not in Batavia. In any part of the country where there is no hospital, the military doctors attend to the sick poor and government servants.

Projected Experiments and Investigations.

All that can be said here is that the Government have ordered all medical practitioners to report every case of cholera which is seen, with results of treatment, age, and sex. This may be a first step towards serious investigation into the cause and prevention of cholera; if so, it will be a step in the right direction—one will wait and see.

UNITED KINGDOM OF GREAT BRITAIN AND IRELAND.

Reports by Dr. Brakenridge, Prof. Cameron, R. Brudenell Carter, F.R.C.S., Dr. Farquharson, Dr. Fish, Dr. Foster, James Hinton, M.R.C.S., Dr. Ireland, Dr. Leslie, Dr. T. More Madden, Dr. Smith, P. W. Squire, Esq., Dr. Tidy, Dr. Wahltuch, etc.

Anatomy and Physiology, Normal and Morbid. *Report by* R. Shingleton Smith, M.D. Lond. (Gold Medal), B. Sc., etc.

Dr. Struthers,* Professor of Anatomy in the University of Aberdeen, describes an *additional bone found in the human carpus.* A similar bone was present in both wrists at the same place. It ranged in the second row, being in the middle, with two on either side in the same row, and was placed between the os magnum, trapezoid, and second and third metacarpals, being of an irregularly quadrate form. In this case five bones existed in the second carpal row, the full typical number, and each articulated with the numerically corresponding metacarpal, but still the unciform supported most of the fourth, and the magnum most of the third. This is interesting from the fact that an intermediate bone occurs normally in the carpus of the orang, and of certain other quadramana, though not in the chimpanzee or gorilla.

Professor Turner† reports a series of cases, seven in all, in which *supernumerary cervical* ribs have been found. In some cases they have been detected during life, and they might if prominent be mistaken for exostosis; if the subclavian artery pass over the abnormal rib, a superficial pulsating swelling will be felt about the clavicle, and near the surface of the neck, which might lead to the suspicion of aneurism.

Professor Cleland‡ makes some observations "*on the variations of the human skull, particularly in the antero-posterior direction.*" A base

* "Journal of Anatomy and Physiology," May, 1869. † Ibid., November, 1869.
‡ "Proceedings Royal Society," 1869.

line extending from the fronto-nasal suture to the back of the foramen magnum is the longest in savage skulls. The distinction between dolicocephali and brachycephali should be based not merely on the cephalic index, but on various other characters; the proportion of height to length is of more importance than that of breadth to length. Orthognathism and prognathism are concrete results of a variety of circumstances, and the extent of facial projection must be measured by an angle contained between the fore part of the face and the floor of the anterior fossa only of the skull.

Dr. J. A. Campbell,* of the Cumberland and Westmoreland Asylum, records a case of *abnormal union of several of the ribs.* On the left side the first and second rib were united by a transverse piece of cartilage half-an-inch in breadth. The sixth and seventh and ninth and tenth were united by pieces of bone; the sixth, eighth, ninth, and tenth, each had a small exostosis projecting from it.

On the right side the first and second, and the fourth and fifth had a bony bond of union; the second and the seventh had also an exostosis projecting from each.

A cartilaginous plate, five inches by three, ossified in the centre, was found in the substance of the diaphragm; and a small cartilaginous plate, about the size of a half-penny, in the substance of the right lung.

Professor Humphrey† records a case of *asymmetry of the two halves of the body.* It existed in a young women, aged 20; the whole of the right side of the body was found to be larger than the left, the difference being most marked in the upper limb. From the acromion to the end of the middle finger there was a difference in length of 2½ inches; from the anterior spine of the ilium to the bottom of foot, the difference was half-an-inch. The condition was congenital. Her mother stated that she was born so, with one arm longer and larger than the other. The asymmetry affected the cranium and face, also the thorax and body generally. There was no indication of present or past paralysis.

Mr. E. Carver,‡ Demonstrator of Anatomy in the Cambridge University, reports a large number of *irregularities in the arteries and muscles* which were found in the body of an idiot.

* "Journal of Anatomy and Physiology," May, 1870.
† Ibid. ‡ Ibid., May, 1869.

Various arteries in all parts of the body were found to have peculiarities in their origin and communications. Abnormalities were also observed in connection with the palmaris longus, lumbricales, and extensor muscles of the thumb. Certain idiosyncrasies were also noticed in the skull: a wormian bone on either side between the lesser ala of the sphenoid and the orbital plate of the frontal bone; an unusual thickness of the walls; unevenness of the internal surface; the oblique diameter from the left side of the occipital bone to the right side of the frontal bone was long, at the expense of the opposite diameter.

Dr. Henry Lawson* publishes an essay on the *anatomical relations of the ciliary muscles in birds*. He regards it as forming not so much a ring as a zone of muscular tissue, the fibres of which pass forwards to the line of junction of the cornea and sclerotic, and backwards for some lines between the sclerotic and choroid. The fibres are inserted into the sheath of the muscle at its anterior extremity, and the inner lamina of the cornea, whilst they arise from the sclerotic but in part also from the choroid. The fibres are striated, and the author considers that the muscle does not act through the choroid on the lens, but on the border of the cornea, and thus increases the curvature of the latter.

Mr. Lawson Tait† puts on record the occurrence of a hitherto undescribed variety of an *accessory muscle*, a stylo-hyoid; and the occurrence of two muscles both quite new, one the supra-costalis of Wood or rectus thoracis of Turner, the other the sterno-clavicularis.

Professor Haughton‡ inquires into the *muscular forces employed in parturition*, and he concludes that the uterine muscular fibres are capable of rupturing the membranes in every case, and possess in general nearly three times the amount of force requisite for that purpose. In the second stage of labour the voluntary action of the abdominal muscles is called into play, to aid the expulsive efforts of the uterine muscles. From experiment he has found that the pressure produced by the action of the abdominal muscles equals 38.47 lbs. per square inch.

Dr. W. H. Broadbent§ makes some observation on *the structure of the cerebral hemispheres*. The brains he examined were hardened

* "Monthly Microscop. Journal," October, 1869.

† "Journal of Anatomy and Physiology," May, 1870.

‡ "Proceedings Royal Society," London, March, 1870. § Ibid., June, 1869.

in strong spirit. He states that the commissural connection between different parts of the brain is much more extensive than has hitherto been supposed, and that the fibres more commonly run longitudinally in the convolutions than across from one to another, while large tracts of convolutions have no direct connection with the crus, central ganglia, or corpus callosum, and the preponderance of commissural over radiating fibres is shown by a comparison of the sectional area of the latter as they issue from the central ganglia with the large surface of white matter seen in the centrum ovale.

Dr. Broadbent* describes the *cerebral convolutions of a deaf and dumb woman*. The brain was of full average size, weighing 45 ounces. The peculiarities noted are, the comparatively small size and simple character of the left third frontal gyrus; a deficiency of annectent convolutions, so that the occipital lobe is almost completely separated from the parietal; a deficiency in the supramarginal lobule, which allows the angular gyrus, usually displaced backwards, to surround the end of the fissure of Sylvius; a degree of simplicity of the occipital lobe generally, and a narrow collateral lobule in the temporo-sphenoidal lobe.

Dr. Rutherford† sums up the chief results of 120 experiments on the *influence of the vagus upon the vascular system* as follows:—

1. The inferior cardiac branches of the vagi are inhibitory nerves of the heart, and their function cannot in any sense be regarded as motor.

2. There is no evidence that they are in constant action, as Von Bezold and others have supposed; indeed, a state of activity seems to be the exception.

3. The increased rapidity of cardiac movement, which often follows division of the vagi in the neck, may be owing to increase of the blood-pressure merely.

4. The increased blood-pressure, which often results from section of the vagi, is not in general due to increased rapidity of the heart's action, but to contraction of the gastric blood-vessels.

5. Additional support is given to the theory that the contractile elements of the entire vascular system are presided over by two kinds of nerves, one motor, the other inhibitory. The former brings about contraction, the latter throws the motor nerves and contractile elements into a state of rest.

* "Journal of Anatomy and Physiology," May, 1870. † Ibid., May, 1869.

6. The vessels of the stomach are dilated during digestion, chiefly by the vaso-inhibitory action of incident filaments of the vagi upon the splanchnic nerves.

Dr. Brown-Séquard* publishes some facts, showing that in the spinal cord there exists a special set of *reflecto-motor nerves distinct from the voluntary motor*. He concludes:—

1. That nerve-fibres, employed in making muscles contract in fits of epilepsy, are quite distinct from voluntary motor nerve-fibres.

2. That these two sets of motor nerve-fibres do not occupy the same place in the spinal cord, the voluntary motor being more in the anterior (grey and white) parts of that organ, the others being chiefly in the lateral column.

Dr. Meryon† commences a paper on *the functions of the sympathetic nerves*, by showing that every sympathetic ganglion in all animals is connected with three forms of nerve-fibres, viz., motor, sensory, and sympathetic proper, or the fibres of Remak; that on entering a ganglion these several forms of nerves separate into their component fibres, and unite with the ganglionic caudate cells; that each ganglion thus becomes a nervous centre in its own sphere, receiving, transmitting, originating, and reflecting impressions, on which the functions and nutrition of organs depend.

Experiments and observations are next adduced to prove that the sympathetic has little or nothing to do with the motions of the iris, but that these actions depend upon the third cerebral nerve, and the fibres proceeding from the regio cilio-spinalis of Wagner and Ruiter.

Dr. Meryon then enters into the inquiry relative to the special functions of each different form of nerve-fibre respectively, which goes to, or proceeds from, every ganglionic centre; and from many experiments and cases he shows that the motor fibres which proceed from each ganglion, having their terminal fibres extending to the most minute arterioles, give an impetus to the blood-current, and are subservient to the functions of the secretory tissues; that the sensory fibres communicate an organic or vital sense to the secretory glandular tissues, just as the muscular sense is conferred on, and conveyed from, the muscles to the nervous centres, to communicate a stimulus to muscular action; that in fact the sensitive fibres affect the histological tissues without operating *immediately*

* "Lancet," January, 1870.

† Paper read at Medical Chirurgical Society, June 14th, 1870.

upon the blood-vessels; finally, that the fibres of Remak, or the sympathetic fibres proper, having a correlative ramification with the motor fibres, regulate the stream of nutriment which is conveyed by the arterioles into the cell territory for secretion and nutrition. This latter function is effected by the restraining or inhibitory attribute of the fibres of Remak.

On these views Dr. Meryon proposes, in a future paper, to enunciate a system of rational therapeutics, founded upon the properties which many medicines are known to possess of inducing, through the influence of the vaso-motor nerves, the contraction or dilatation of blood-vessels.

The physiology of *binocular vision* has received another contribution from Mr. Towne, with whose previous observations the readers of the Guy's Hospital Reports will be familiar. The conclusions at which he arrives, in the elaborate paper published in this year's Reports, are:—

That the images of all objects, placed within the transverse visual plane, are referred to the opposite side of the field—that is, to the side of the field opposite to that occupied by the object viewed,—and that this phenomenon is special to the transverse visual plane.

That in selecting the transverse visual plane, as the region for his experiments, and in having applied to the field generally the exceptional phenomena special to this region, Hering has committed an error, which is fatal alike to the consistency of his experiments, and to the soundness of his conclusions.

That the phenomena, on which Hering has based his theory, are inseparably connected with a near convergence of the eyes, and we assert that similar phenomena cannot occur, the field being viewed with the optic axes parallel.

The pathology of *exophthalmic goitre* is dilated on by Dr. Wilks, in the Guy's Hospital Reports. After mentioning the theory which supposes the disease to be due to paralysis of the cervical sympathetic, he alludes to the fact that experimental physiologists have shown no results from division of the sympathetic at all comparable with what is observed in this disease. Bernard, by dividing the sympathetic, produced increased vascularity on that side, with rise of temperature and dilatation of the pupil; but he did not produce any of the other symptoms of exophthalmic goitre. Supposing that paralysis of the sympathetic would account for dilatation of the vessels in the neck, it would not account for the

rapid action of the heart, since the experimental physiologists say that paralysis of the sympathetic diminishes the heart's action, and their results are corroborated by cases of accidental injury, involving the sympathetic, in which slow pulse and feeble heart's action occur.

The effect of destruction of the sympathetic is to paralyse the heart; we cannot, therefore, assume that such paralysis has taken place in Graves's disease, nor can we assume that the nerve is over-active, for if so it would diminish the calibre of the vessels of the neck and head, and retard the circulation. Whilst then we may look for a nervous cause, we must not admit in theory that destruction of the sympathetic is that cause; if, however, actual observation shows the contrary, then the results of the physiologists must be at fault.

Dr. Wilks then alludes to the resemblance between this disease and some cases of chlorosis, and thinks it a question whether in dealing with these two diseases we have to do with two things merely presenting some symptoms in common, or whether they have pathologically a much closer intimacy.

Dr. Moxon reports on the condition in which the sympathetic ganglia were found in a fatal case of the *maladie de Graves*; he concludes:—

"The microscopic characters of these ganglia, like the macroscopic, only gave us, as signs of disease, an apparent excess of fibrous tissue in the structure of the ganglionic tissue, with an apparent enlargement of the capillary vessels. On the other hand, against this we find the natural minute elements of the ganglion to have a healthy appearance. The presence of an excess of fibrous tissue in the structure of an organ is a common morbid state, and characterises especially those conditions known as cirrhosis. But when a state of cirrhosis exists, there is always more or less of another change, viz., the destruction of the functionary elements of the organ, *e.g.*, in the liver of the cells, in the kidney of the tubes, in the lungs of the air-vesicles. Now it is to the destruction of the functionary tissue, rather than to the pressure of the excess of fibrous tissue, that the symptoms of cirrhosis are to be ascribed. . . I am, therefore, inclined to think that the fibrous tissue in this case is accidental to the real cause of the exophthalmos. This is the more likely, as another observer has discovered a red and swollen state of the ganglia as a cause of exophthalmos. . . . On the whole, then, I cannot say with confidence that the cervical ganglia in this case were diseased."

Mr. David Smith* describes the *structure of the adult human*

* "Lancet," 1869.

vitreous humour. He has sometimes seen traces in the adult of the hyaloid canal, which gives passage to the embryonic hyaloid vessels; eight or ten concentric circles, formed of strong smooth fibres, arise at right angles from, and surround the inner surface of the zonule of Zinn. They are directed backward to the entrance of the hyaloid canal, and subdivide the entire circumference of the humour into shallow horizontal spaces, which build up layer on layer the sides of the vitreous body. In the spaces between these smooth fibres, and in the part of the humour which lies behind the lens, an anastomosing cell net-work lies, the filaments of which cross the short diameter of the spaces, and have a radiating direction from the vertex to the sides of the vitreous body.

Dr. Clifford Allbutt * makes some observations on the *changes in the eye symptomatic of spinal disease*. He finds that they may be classified under two heads:—

1. Simple or primary atrophy of the optic nerve, sometimes accompanied at first by that slight hyperæmia and inactive proliferation, which make up the state called chronic neuritis. This sort of change has not been found as a result of spinal injuries, but has been met with in chronic degeneration of the cord, and in locomotor ataxy.

2. A somewhat characteristic hyperæmic change, which has not been seen in chronic degeneration or in locomotor ataxy, but in cases of injury to the spine only. The retinal arteries do not dilate, but become indistinguishable, while the veins begin to swell, and become dark and tortuous. The disc then becomes uniformly reddened, and its borders are lost, so that the disc is obscured, or its situation known only by the convergence of the vessels.

Dr. Allbutt has never seen true optic neuritis with active proliferation as a sequel of spinal disease.

Dr. Tuckwell, in St. Bartholomew's Hospital Reports, describes a *severe fatal case of chorea*. At the autopsy it was found that—

"On tracing out the posterior cerebral artery, and thereby displacing the middle cerebral lobe, the under part of this lobe on the right side was in a state of softening. This softening was not excessive, but was easily recognisable; it had not apparently affected the very surface of the convolutions, but involved the deeper layers of the cortex, and more especially the subjacent white substance, extending upwards into the neighbourhood of the corpus striatum and optic thalamus, which ganglia lay, as it were, imbedded in a

* "Lancet," January 2, 1870.

nest of softened cerebral matter. The softened tissue was redder than the surrounding healthy white substance, this red tinge being especially pronounced in the deepest layer of the cortex. The corpus striatum was, seemingly, not itself affected. The optic thalamus was encroached on at its under and outer aspect by the disease, but was in the main firm and apparently natural. The corresponding part of the brain in the left hemisphere was likewise soft, but less so, both in extent and degree, than on the right side. The rest of the brain, cerebellum, pons, and medulla, had a remarkably firm and healthy appearance.

"Microscopic examination of the fresh brain-tissue showed that in these parts, which to the naked eye appeared soft, many of the small blood-vessels were dotted along their walls with minute granules, scattered, and in clusters. In the firm, healthy-looking brain tissue no such appearance could be detected."

"The mitral valve, examined from its ventricular aspect, seemed perfectly competent, and presented no unusual appearance; but examined from its auricular aspect, by opening out the left auricle, it was altered as follows:—A line of numerous bright, clustering, warty vegetations, some as large as a pin's head, others so minute as to be only just visible to the naked eye, and that in a certain light, but shining like little white beads when slightly magnified, extended in a sinuous course all along the free margin of each cusp. In two or three places these little growths appeared to have been shed off, for they hung only by a fine pedicle to the line of attachment, and clung close to the chordæ tendineæ.

"The kidneys were natural in size and colour, but a close inspection of their surface brought into view several small, deep, red spots or blotches, like ecchymoses. Each of these little blotches was seen, on section perpendicular to the surface, to extend in the form of a wedge into the cortex. In one of these, the interior was yellow, and surrounded by a deep red exterior or border, bearing evidence of a more advanced change than the rest. On microscopic inspection three small arteries, which lay in close apposition, and led up directly towards the largest of the patches in question, were distinctly seen to be blocked up by small obstructions, which completely filled up their calibre. With a low power these obstructions had a red tinge; but, with a higher power, it was evident that this red colour was due to a layer of red blood-cells, collected round some deeper-seated foreign body, which was quite opaque."

Dr. Tuckwell considers this case an important one with regard to the embolic theory of chorea, which was first advocated by Kirkes, and which has since been adopted and extended by Hughlings Jackson, and Broadbent. Jackson argues with great force that the part of the brain specially implicated in chorea is the nerve-tissue forming the convolutions near the corpus striatum. This particular part of the brain is supplied by branches of the middle cerebral artery; by embolic obstruction of the smaller of

these branches the nutrition of the brain is interfered with and rendered unstable, but not destroyed—for destruction of the part would be followed by paralysis—and, in consequence of this instability or disordered nutrition, choreic movements follow. The frequent occurrence of unilateral chorea, with affection of one side of the face, and the not infrequent termination of the spasm in paralysis of one side, are arguments in favour of Jackson's proposition as to the locality of the lesion. Broadbent does not, like Jackson, regard embolism as the exclusive source of lesion, but only as the most common and important one. He considers chorea symptomatic only of the seat of the disease, and thinks that we must not look for the cause of chorea in any single specific pathological condition of the sensory-motor ganglia.

Dr. Ogle and Dr. Barnes have come forward as opponents of the embolic theory; the arguments they advance are very weighty: the question whether any or all cases of chorea depend on capillary embolism of the middle cerebral arteries, still remains sub-judice, and it rests with the originators of the theory to answer some of the objections, and to establish their case by means of pathological facts, such as those which Dr. Tuckwell reports.

Dr. Wilks, in the Guy's Hospital Reports, makes some observations on cases of *labio-glosso-laryngeal paralysis*. One case is reported in which a post mortem examination was made, and in which atrophy of the medulla oblongata, with atrophy and degeneration of the spinal motor tracts, and the motor roots of the nerves, was found. The glosso-laryngeal symptoms had been associated with those of progressive muscular atrophy. Dr. Wilks supposed the disease to have begun in the medulla, and to have then spread to the motor tracts of the cord, and the motor nerves, and he looked upon it as a confirmation of the fact that progressive muscular atrophy has a central origin, and is not a local disease of the muscles.

Dr. Peacock * records a case of *malformed heart* where there was atresia of the orifice of the pulmonary artery, and where the aorta communicated with both ventricles. He records a second case of similar nature on page 87.

Mr. W. Hickman † describes a heart where the auricles and aorta were transposed, the pulmonary artery absent, the foramen ovale

* Trans. Path. Society, vol. xx. p. 61. † Ibid., p. 88.

patent, and the ventricles communicated with each other; the principal viscera were laterally transposed; cyanosis existed. The same author records a case of *persistent vitelline duct* in a female child, four months old.

Mr. T. P. Pick * describes a case of *double monstrosity*, where the twins were joined along the whole length of the sternum, and as low down as the umbilicus.

Dr. Herbert Davies † commences his paper on *the law which regulates the relative magnitude of the areas of the four orifices of the heart* by computing the areas according to measurements of the circumference given by Dr. Peacock. They are as follows:—

Tricuspid	1·78 sq. in.
Pulmonic	1·00 ,,
Mitral	1·27 ,,
Aortic	0·78 ,,

By comparing the ratios of the areas of corresponding orifices, thus—

$$\frac{\text{Area of tricuspid}}{\text{Area of mitral}} = \frac{1{\cdot}78}{1{\cdot}27} = 1{\cdot}4 \text{ nearly,}$$

$$\frac{\text{Area of pulmonic}}{\text{Area of aortic}} = \frac{1{\cdot}00}{0{\cdot}78} = 1{\cdot}3 \text{ nearly,}$$

it is found that the area of the tricuspid bears nearly the same relation to the area of the mitral, which the area of the pulmonic does to that of the aortic orifice.

Again, by treating Dr. Reid's measurements in a similar way, this law is found to be still more conclusively proved—

$$\frac{\text{Area of tricuspid}}{\text{Area of mitral}} = \frac{2{\cdot}24}{1{\cdot}7} = 1{\cdot}31$$

$$\frac{\text{Area of pulmonic}}{\text{Area of aortic}} = \frac{1{\cdot}01}{0{\cdot}8} = 1{\cdot}26$$

$$\text{Difference of the ratios} = 0{\cdot}05$$

Dr. Davies infers that no one can observe the close identity of the respective ratios without concluding that the ratios are really identical, and that the small differences in the calculated results depend entirely upon the impossibility of obtaining absolutely correct measurements of the boundaries of such openings. This

* Trans. Path. Society, vol. xx. p. 423.

† "Proceedings of the Royal Society," No. 118, 1870.

result is corroborated by other measurements of the healthy heart made by the author. Furthermore, it is proved that the same law regulates the areas of the orifices in animals generally, and of this several illustrations are given. From the existence of this law, it is clear that if the areas of any three healthy orifices be known, the area of the fourth can be determined by calculation.

Again, it is observed that the ratio of any two corresponding orifices is almost constant in the same, and almost in all animals, man included—

$$\frac{T}{M} = 1{\cdot}3 \text{ to } 1{\cdot}4 \text{ nearly, and } \frac{P}{A} = 1{\cdot}3 \text{ to } 1{\cdot}4 \text{ nearly;}$$

consequently, the dimensions of the openings of one side being given, the areas of the corresponding orifices on the other side of the organ may be obtained by calculation.

Dr. Davies then tries to seek out reasons why the four orifices present such differences as are found in the magnitude of their areas.

First of all, he gives reasons for accepting as facts that—1. The ventricles and auricles act exactly synchronously respectively; and 2. Equal volumes of blood pass in exactly equal and the same times respectively through any two corresponding orifices of the healthy heart. He further assumes that—

1. { Equal times of ventricular contraction,
   { Equal times of ventricular dilatation,
2. { Equal or almost equal volumes of blood received in diastole,
   { Equal or almost equal volumes of blood expelled in systole,
3. Equal or almost equal capacities of ventricles,

are the main characteristics of a heart which is normal in structure, and perfect in function.

As, then, the two ventricles contracting with *unequal forces* have to expel *equal quantities* of blood in *equal and the same times* to *unequal distances*, and to overcome *unequal resistances*, the perfect synchronism of the ventricular contraction can be only obtained by an exact graduation of the areas of the orifices of the aortic and pulmonary arteries to the muscular forces respectively impressed upon the contents of the two ventricles in systole, and consequently to the velocities of the streams issuing from those chambers. The greater muscular power of the left, as compared with that of the right ventricle, causes a corresponding greater velocity and force of the column of blood issuing from its outlet, while the smaller area of the aortic, as compared with that of the pulmonic opening, exactly equalises the times occupied by the contractions of the two

chambers. The velocities of the streams through the orifices are inversely as the areas of those orifices, or—

$$\frac{\text{velocity through aortic opening}}{\text{velocity through pulmonic opening}} = \frac{\text{area of pulmonic opening}}{\text{area of aortic opening}},$$

$$\left.\begin{matrix}\text{velocity through}\\ \text{aortic opening}\end{matrix}\right\} = \frac{1 \text{ sq. in.}}{0{\cdot}75 \text{ sq. in.}} \times \left\{\begin{matrix}\text{velocity through pulmonic}\\ \text{opening}\end{matrix}\right.$$

$$= \left\{\begin{matrix}1\tfrac{1}{3} \text{ time the velocity through pulmonic}\\ \text{opening,}\end{matrix}\right.$$

or, in other words, the velocities of the currents through the aortic and pulmonic orifices are in the ratio of 4 to 3. In a similar way it may be shown that the velocities of the currents of blood in diastole, through the tricuspid and mitral orifices, are in the ratio of 5 to 7.

By estimating the mean amount of the ventricular contents at 3 ounces, or 5 cubic inches, it is easy to calculate the average velocities of the currents which traverse the four orifices.

Considering the pulse to beat at the rate of 70 per minute, and the periods of ventricular contraction and dilatation to be in the ratio of 1 to 2, *i.e.*, the ventricular contraction occupying one-third of the time between two pulses, *i.e.*,

$$= \tfrac{1}{3} \text{ of } \frac{1'}{70} = \frac{1'}{210},$$

we have—

$$\text{velocity through aortic orifice} = \frac{\text{velocity expelled in } \frac{1'}{210}}{\text{area of aortic orifice}}$$

$$= \frac{5 \text{ cubic in.}}{\cdot 75 \text{ sq. in.}} \text{ in } \frac{210}{1'},$$

$$= 23{\cdot}1 \text{ inches in 1 second,}$$

$$= 2{,}310 \text{ yards per hour.}$$

Similarly, the velocities through the other orifices are calculated to be as follows:—

Aortic	= 2,310 yards	= 1·3 mile per hour	
Pulmonic	= 1,725 ,,	= 1·0 ,, ,, ,,	(nearly)
Mitral	= 700 ,,	= 0·4 ,, ,, ,,	
Tricuspid	= 500 ,,	= 0·28 ,, ,, ,,	

From this it is evident that the velocity of the tricuspid incoming current is only one-fifth of the velocity of the stream which passes through the aortic orifice.

Dr. Davies concludes his paper by applying the *law* of the orifices to the study of some forms of valvular disease.

C. Trotter,* M.A., Fellow of Trinity College, Cambridge, makes some observations criticizing Dr. Davies' paper on the *law which regulates the relative magnitude of the areas of the four orifices of the heart.*

His final conclusions are as follows:—

1. There is sufficient reason for the small area of the aortic as compared with the pulmonic orifice; but this has nothing to do with any necessity for impressing a greater velocity on the blood entering the aorta.

2. There is no proof that the ratios

$$\frac{\text{Area of Tricuspid}}{\text{Area of Mitral}} \text{ and } \frac{\text{Area of Pulmonic}}{\text{Area of Aortic}}$$

are identical. He maintains that in only a few cases can the agreement be considered close; he also objects to the want of accuracy of the measurements on which the calculations are based. In computing the areas, the orifices are assumed to be circular; the radius is calculated from the circumference, and the area from the radius as so determined; this, Mr. Trotter thinks, must lead to incorrect results when applied to the mitral and tricuspid orifices, which constantly vary in shape, and are probably at no time even approximately circular.

Mr. A. H. Garrod,† of St. John's College, Cambridge, makes some observations on the cause of *the diastole of the ventricles of the heart.* He assumes the existence of an active ventricular diastole, and he endeavours to show that this active diastole is mainly dependent on the turgescence of the walls of the heart, consequent on the flow of blood into the coronary arteries immediately after the systole. He maintains that during the ventricular systole the circulation in the walls of the heart ceases on account of the close relation between the segments of the aortic valve and the orifices of the coronary arteries. Immediately the aortic valve is closed, the impediment to the flow of blood into the coronary vessels is removed, and the sudden repletion thus caused, directly after the closure of the valve, produces an equally sudden turgescence of the walls of the ventricles, the auricles from their thinness not being similarly affected. This turgescence of the tissue of the heart produces an active opening out of the cavities of the ventricles, and in a very short time they reach their maximum size. Mr. Garrod mentions an experiment to show that injection of the coronary vessels not only causes turgescence of the ventricular walls, but

* "Journal of Anatomy and Physiology," May, 1870. † Ibid., May, 1869.

also opens out the cavities of the ventricles to their fullest extent. Marey found by means of ampoules placed in the ventricles that an absorptive force was exercised in both the ventricles immediately after the closure of the aortic valve; this fact tends to corroborate Mr. Garrod's theory. The relation between the cardiograph traces from the ventricles and aorta is considered by Mr. Garrod to show that a tendency to the formation of a vacuum in the ventricles exists immediately after the systole, the auricles at that time are quite full, and the blood rushes from them so forcibly that a slight undulation is thereby produced in the ventricular trace.

Dr. Michael Foster* makes some observations on the action of the interrupted current on the *ventricle of the frog's heart*. He noticed that if the lower portion of the ventricle, devoid of spontaneous energy, be submitted to the influence of a feeble interrupted current the piece of cardiac muscle will not, as would a piece of ordinary muscle, be thrown into tetanus, but will give a series of beats separated from each other by distinct intervals of complete rest. This circumstance, coupled with the well known fact that it is very difficult to throw the heart into tetanus by any use of the galvanic current, leads to the inference that the cardiac muscular tissue itself differs from ordinary muscular tissue in a disposition towards rhythmic rather than continuous contraction, and that the influence of the ganglia is probably not rhythmic but continuous.

A case of *general chronic arteritis* is reported by Dr. Wilks in the Guy's Hospital reports. The patient was 38 years old, had no syphilitic or rheumatic history, and his disease was of nine months' duration. At the post-mortem examination the aorta and cervical arteries were found to be patched here and there with superficial atheromatous degeneration. The right brachial artery was permeable as far as the ulnar, but then it became suddenly occluded, as also did the ulnar, both arteries being thus wholly obsolete. The iliac and femoral arteries were also full of old adherent brown clot, and the coats swollen and atheromatous.

Capillary embolism or arterial pyæmia is commented on by Dr. Wilks in the Guy's Hospital reports. By the term embolism is generally implied the case of a blocking of a large vessel and the resulting local symptoms, but under it should be included the

* "Journal of Anatomy and Physiology," May, 1869.

equally important and common case of the obstruction of the smaller arteries with attendant constitutional symptoms. Just as there is a venous pyæmia having its source on the outside of the body, so there is an arterial pyæmia having its origin within.

Rokitansky described the fibrinous masses found in the solid organs of the body under the name of capillary phlebites, and it was his opinion that they were due to some spontaneous disease of the blood. Dr. Kirkes contradicted this view, and maintained that these particles of fibrine had been carried from the heart where they had been previously formed. Dr. Wilks believes that, although Kirkes may be right in the main, yet Rokitansky's statement is equally true, that deposits may occur from changes in the blood itself.

Dr. George Johnson* describes and makes remarks on the *hypertrophy of the muscular walls of the minute arteries* in cases of chronic Bright's disease. It occurred to Dr. Johnson that the hypertrophy of the left ventricle in cases of chronic Bright's disease might be a result of increased contraction of the small arteries, excited by the abnormal quality of the circulating blood; if this were so, evidence of the fact would be found in the existence of hypertrophy of the muscular walls of the minute arteries in various tissues; this was accordingly sought for, and was found to be unmistakeably present, not only in the arteries of the kidney, but also in those of the pia mater, the skin, the intestines, and the muscles.

The thickening of the arterial walls is an undoubted instance of genuine hypertrophy. It is an increased growth of a normal tissue, without change of texture. The walls of the hypertrophied arteries have precisely the same structure and appearance as those of normal arteries, but their muscular tissue is increased in amount.

Dr. Johnson sums up some of the phenomena of chronic Bright's disease which are explained by the facts just referred to.

1. The hypertrophy of the left ventricle is explained. That which Dr. Bright long ago surmised is now a demonstrated fact. There is an impediment to the passage of the altered blood through the distant sub-divisions of the vascular system; hence arise greater action of the heart and hypertrophy of its walls.

2. The full, hard, radial pulse, and the increased pressure on the arterial walls indicated by the sphygmograph, are explained by the co-existence of excessive cardiac force with an equal, or more than equal, excess of arterial resistance.

* "British Medical Journal," April 16, 1870.

3. The excessive dryness of the skin, and the difficulty of exciting diaphoresis, even by the hot-air bath, are accounted for by the over-action of the hypertrophied subcutaneous arteries resisting the relaxing effect of external warmth, which has so powerful an influence upon the healthy skin.

4. One result of excessive resistance throughout the whole systemic arterial system must be to impede the passage of blood from the venous system through the lungs, and thus to favor the occurrence of dropsy by an influence not unlike that of a defective valve on the left side of the heart. The influence of arterial resistance in retarding the circulation will mainly depend upon the extent to which this is contracted by hypertrophy of the left ventricle of the heart.

5. Lastly, the not unfrequent occurrence of cerebral hæmorrhage is explained. While the minute cerebral arteries resist the passage of the blood, the strong left ventricle is forcibly driving it onwards. In the struggle between the two contending forces an artery gives way, and the result is cerebral hæmorrhage and apoplexy.

Dr. Thomas Albert Carter* communicates a paper on the *distal communication of the blood-vessels with the lymphatics*, and on *a diaplasmatic system of vessels*. A large number of important facts are mentioned which bear directly upon the distal communication of the blood-vascular with the lymphatic system, and which illustrate how widely distributed are the plasma-conveying channels in the vertebrate organism. The conclusion seems to be justified that such channels are common to all organs and tissues with the exception of articular cartilage. These channels are shown to consist of a very minute network in communication with the vessels, and also with the lymphatics, capable of being injected by means of transparent injection of great penetrating power, but not permeable to mineral injecting fluids, and not permeable for blood corpuscles, their diameter being from $\frac{1}{4000}$ to $\frac{1}{8000}$th of an inch.

Dr. Blake,† of San Francisco, reports some experiments illustrating the *action of the compounds of chlorine, bromine, and iodine, when introduced directly into the blood.* The acids used were, chloric and hydrochloric, bromic and hydrobromic; the results show that these compounds produce exactly analogous effects, and they so far support the law of the analogous action of isomorphous sub-

* "Journal of Anatomy and Physiology," November, 1869. † Ibid.

stances. The experiments were performed on dogs, and the acids were introduced by the axillary vein, or axillary artery, the blood-pressure being determined by means of the hæmadynamometer. The most striking effects are the contraction of the blood-vessels, both systemic and pulmonary; in one instance arresting the passage of the blood through the lungs, rapidly leading to changes in their texture, and effusion into the bronchial tubes, and in the systemic arteries augmenting the blood-pressure from five or six to ten or twelve inches. The respiratory movements were arrested or suspended for three or four minutes, and again commenced after unoxygenated blood had been circulating for this time through the nervous centres. The irritability of the heart continued nine minutes after respiration had ceased; this was shown not only by slight peristaltic movement, but by regular rhythmical contraction, strong enough to continue the circulation under almost the normal pressure. This isomorphous group is mainly distinguished by their power of destroying the reflex action of the nervous centres, manifested by cessation of the respiratory movements. The persalts of iron exert an analogous influence on the systemic circulation, but do not suspend the respiratory function. The haloid group act also as excitants of the muscular tissue of the heart, for only in this way can we explain the continuance of strong rhythmical contractions so many minutes after the arrest of respiration. By these two characteristics the chlorides and their isomorphous allies can be distinguished in their physiological action from any other isomorphous group.

Dr. Blake,* of San Francisco, further reports on the action of the *isomorphal magnesian group* of inorganic substances *when introduced directly into the blood.* This group includes the salts of magnesia, lime, zinc, iron, copper, manganese, nickel, cobalt, and cadmium. The experiments point out a close agreement between the physiological action of all these substances, which are possessed of very different therapeutic and toxicological properties. The most marked reaction manifested was on the nervous system; the effect on the respiration, the vomiting, the prostration, and even the more ready passage of the blood through the capillaries, may be accounted for by their action on the nervous centres. The above symptoms, together with the absence of convulsions, the freedom from pain, and the unimpaired sensibility, suffice to distinguish the physiological action of the substances of the magnesian group for that of any other isomorphous group.

* "Journal of Anatomy and Physiology," May, 1870.

Dr. Brunton* details some investigations on the *chemical composition of the nuclei of blood-corpuscles*. Professor Kuhne discovered that the chief constituent of these nuclei agreed in its reaction with mucin rather than with fibrin or albumen. Dr. Brunton verifies this statement.

Mr. H. C. Sorby, in his paper on *blood, the detection of, by means of the spectrum-microscope*, published in the "Guy's Hospital Reports," gives a very concise description of the spectroscopic examination of blood. The spectrum of fresh blood gives two well-defined absorption-bands in the green; exposure of the blood to air causes these bands to be fainter, and another band appears in the red; the relative distinctness of this shows the amount of change, and is some indication of the age of the stain. The addition of citric acid to the fluid causes the absorption-bands of the fresh blood to disappear, and they are not restored by the subsequent addition of excess of ammonia. The hæmatin may be deoxidised by the agency of proto-sulphate of iron, when the well-marked absorption-band of deoxidised hæmatin gradually makes its appearance in the green with a second fainter band nearer the blue end. Mr. Sorby finds that good evidence of the presence of blood may be obtained from an extremely faint stain, since $\frac{1}{10000}$th of a grain of blood suffices to show a characteristic spectrum, and he has been led firmly to believe that there is no difficulty in obtaining satisfactory proof of the presence or absence of blood by means of the spectroscope. He does not, however, at present, see any probability of deciding by the spectra from what kind of animal the blood came.

Dr. Bastian exhibited to the Pathological Society in May, 1869, some specimens illustrative of the formation of *bacteria in blood*. He alluded to the notions of Salisbury and Hallier, and had examined the blood in many morbid states for the purpose of testing their conclusions. He had never found anything which could be called a spore, but he had found small moving particles in certain diseases, as typhus and chlorosis. In a case of chlorosis he found that these particles were apparently produced by protrusions from the red blood-corpuscles. In typhus they were probably formed in the blood plasma. In one case many were found in the pia mater.

* "Journal of Anatomy and Physiology," November, 1869.

Sir Duncan Gibb, Bart., read a paper at the meeting of the British Association, held at Exeter in 1869, on *an obstacle to human longevity* beyond seventy years. He reported an experience of 5000 cases in which he had examined the position of the epiglottis, the persons being all healthy, and of different ages. In 11 per cent. of these the epiglottis was pendent. He is of opinion that the cartilage is in no case pendent over seventy years. In persons from 70 to 95 years of age, of whom he has examined several, the cartilage was vertical; the same thing was observed in a person who had reached 102 years of age. From his observations, Sir Duncan Gibb concludes that pendency of the epiglottis is adverse to longevity.

The same author discovers a cause of diminished longevity among the Jews; this is attributable to the use of olive oil as food. Persistent feeding on oil gives to the Jews a "sanguineo-oleaginous expression;" in such conditions life is comparatively short. Death occurs from congestive disease before they reach the last term of natural existence. In them the epiglottis is usually pendent.

Dr. Arthur Ransome describes an instrument constructed to measure simultaneously, in three dimensions, the *movements of any point on the chest during one or more acts of respiration.* Some of his conclusions, derived from observation of the action of this stethometer, are as follows:—

1. In ordinary breathing, in adults, the extent of movement of the ribs is very small, and is very irregular in extent, even in the same person.

2. At different ages the degree and kind of movement varies greatly, and there seems to be no fixed proportion between the extent of movement in different directions; as a general rule, however, the upward movement exceeded the forward.

3. In individuals of the same age, without any real difference in the capacity of the chest, there is often a very different extent of movement of the chest walls. Sometimes the motion indicated by the instrument is less when the capacity of the chest is greater. These measurements, in fact, simply express the different degrees of elasticity of the chest and the varying mobility of its parts.

Dr. Chiene,* Demonstrator of Anatomy in the University of Edinburgh, reports the occurrence of a *supernumerary lobe to the*

* "Journal of Anatomy and Physiology," November, 1869.

right lung. The abnormal lobe is added to, not formed at the expense of the primary lobes. It was found lying between the upper lobe of the lung and the bodies of the dorsal vertebræ, was pear-shaped, 3¼ inches long, 2 inches broad, and 1 inch at its junction with the mass of the lung, and was separated from the upper lobe by a double fold of the pleural membrane.

Professor Cleland* mentions a case, similar to that reported by Dr. Chiene, in which a *supernumerary lobe existed in the right lung.* In both cases the extra lobe was similarly situated, passing upwards from its origin, near the root of the lung, lying in a pleural pouch, and with the vena azygos in front of it. This is not likely to be the result of a mere accidental tendency to redundant lobulation of the lung. Professor Cleland gives a satisfactory explanation of the phenomenon. He believes that there has been at a very early period of fœtal life a slight adhesion of the lung to the thoracic wall, or, much less probably, an undue curvature of the embryo, so that the vena azygos as it bent downwards to a position at right angles to its original direction (in accordance with an alteration in the position of the vena cava superior resulting from the descent of the heart from the cervical region into the thorax), instead of slipping behind the pleura and lung, dragged down a fold of the former, and deeply notched the latter.

Dr. Ransome,† of Manchester, reports some experiments on the *organic matter of human breath* in health and disease. He calculates that about three grains of organic matter are given off from a man's lungs in twenty-four hours whilst in a state of health. In disease there is a much greater variation in the amount and kind of exhaled matter. The author reports some observations of his own on the nature of the organic contents of respired air, and he adds that they do not afford any proof of the germ theory of disease, nor do they justify the alarming doctrines which have been rife of late as to the presence of organisms in the breath. They simply show the readiness with which the aqueous vapour of the breath ferments or putrefies, and the consequent danger of overcrowding, and the paramount importance of ventilation.

Professor Turner‡ notes a case of *displacement of the sub-maxillary glands.* No sub-maxillary glands were present in the di-

* "Journal of Anatomy and Physiology," May, 1870. † Ibid.

‡ Ibid., November, 1869.

gastric triangles, but beneath the mylo-hyoid muscle in the position of the sub-lingual gland a large amount of gland substance was found, which could be readily divided into two portions, the lower of which resting on the genio-hyo-glossus, close to the genio-hyoid, seemed to take the place of the ordinary submaxillary gland.

Dr. Jago,* Physician to the Cornwall General Infirmary, comments on the question, "*When and how the Eustachian tube is opened?*" He gives the conclusions to which Toynbee adhered, as follows:—Firstly, that the faucial orifice of the Eustachian tube is always closed, except momentarily, during the act of deglutition, or when air is forcibly blown through it; secondly, that the Eustachian tube is opened by the muscles of the palate, the tensor, and levator palati. Dr. Jago verifies the first proposition; he concludes that it is of utter indifference to hearing, provided that the aërial pressure on the two surfaces of the membrana tympani be equal, whether the tube be closed or open; this fact has been also proved by Professor Cleland. Dr. Jago also ascertained that in the case of the Eustachian tube being unclosed, the noises from breathing through the nostrils, from vocal utterances, sneezing, coughing, &c., enter the drum directly through the tube, producing a grievous annoyance by their loudness and disagreeable shocks upon the membrana tympani, and that the intrusion of aërial currents into the ear in this way, on the occurrence of violent explosive expirations, even threaten the integrity of the membrane and of the ossicular chain. The tube is, therefore, ordinarily closed, as a provision against such accidents. Another conclusion to which Dr. Jago arrives is, that the glottis and Eustachian tubes must never be open at the same time. He says, "The Eustachian tubes are shut whenever the glottis is open, but whatever act shuts the latter opens the former. I should anticipate that the muscles which drag up the glottis under the tongue, that is, towards the tubes, must have some share in preserving this correlation between the glottis and the Eustachian tubes." The paper concludes with some observations on the act of swallowing, and with an attempt to particularise in what way the muscles act so as to close the larynx and open the tubes at the same time.

Professor Horsford,† of Cambridge, U.S.A., makes a communication to the Royal Society "*on the source of free hydrochloric acid in*

* "Journal of Anatomy and Physiology," May, 1869.

† "Proceedings of Royal Society," No. 111.

the gastric juice." He believes that "whatever other peculiarities the blood-corpuscles may possess, they have the requisites for furnishing acid phosphates in solution under pressure, such as may attend engorgement of the capillaries in the walls of the stomach." He shows that by the reaction of acid phosphates on alkaline chlorides, free hydrochloric acid is obtained, and this process he supposes to occur in the stomach. The author adds as follows:—"Let us glance at what takes place, in all probability, as the acid fluid enters the gastric tubules. They are surrounded by a mixture of hydrochloric acid, acid salts, neutral salts, and albuminoid bodies. Dialysis must be repeated, and a stronger acid solution pass into the sacs or cells contained in them. The sacs swelling by endosmosis and corroded by the acid, must, at length, burst, and the liquid contents, together with the disintegrated and partially digested membrane of the sacs, pass out into the stomach, to constitute the gastric juice, the free hydrochloric acid, and phosphates and chlorides, and the albuminoid bodies and disintegrated tissues (pepsine ?) to act in the liquefaction of food.

Dr. J. Hughes Bennett, in his address on physiology delivered at the annual meeting of the British Medical Association, July, 1869, concludes that the question, *whether mercury be or be not a cholagogue*, has, after two years' laborious enquiry, been decisively answered in the negative. No pains were spared by the Committee in making their enquiry exhaustive. Their experiments and observations were so planned, so carefully performed, and so fully considered, that up to that time no adverse criticism had been advanced. It may, therefore, now be received as an unquestionable fact, contrary to the almost universal opinion which previously existed, that mercury has no special action on the liver, nor possesses any power whatever of increasing the flow of bile from that organ.

The committee has further shown that such action and power have been also erroneously attributed to taraxacum and podophylline.

Dr. Broadbent,* Lecturer on Physiology at St. Mary's Hospital, makes some comments on the so-called *selective absorption by the lacteals and lymphatics.* He concludes that the conditions under which the absorption by the lymphatics takes place, render it

* "Journal of Anatomy and Physiology," November, 1869.

evident that the process is merely passive; they cannot be said to exercise absorption in any sense whatever; they simply receive the spare nutrient material which is forced onwards by the continued exudation of fresh fluid from the capillaries, and finds its way along the vessels to the thoracic duct. The non-diffusible colloid matters which have traversed the delicate capillary membrane outwards under pressure, cannot return against pressure, and must remain in the intertextural spaces, which are no other than the commencing lymphatics.

The lacteal absorption, again, is not selective and special, but general and residual, and the office of the lacteals is not the abstraction from the mixed contents of the intestine of the fat as an ingredient of special value, but to prevent the waste of this valuable ingredient by providing a readier mode of access to the blood in the place of the slow diffusion through the capillary walls, which would result from its high osmotic equivalent.

The Rev. W. Vernon Harcourt read a paper before the Exeter meeting of the British Medical Association on the solvent treatment of *uric acid calculus*, and the *quantitative determination of uric acid* in urine. He is unable to produce any chemical evidence in favour of the solvent treatment, but still he thinks that a solvent action was really going on under the influence of large doses of citrate of potash. A constant deposit took place in the urine, in which fragmentary particles of uric acid were discerned by the microscope enveloped in mucus, and bearing, in the opinion of Mr. Spencer Wells, a close resemblance to the detritus left by the incomplete action of carbonate of potash on fragments of uric acid calculi. (For full details, see report on "Chemistry.")

Dr. John Harley read a second paper before the Royal Medical and Chirurgical Society, in September, 1869, on the *endemic hæmaturia of the Cape of Good Hope and Natal*. Five years had elapsed since the author showed this disease to be due to a nematoid worm, a species of bilharzia. During this time he has obtained the urine of three other patients suffering from the disease; in all of them the ova of bilharzia were readily detected. In one case the parasite extended to the kidney, and renal calculi were occasionally passed. Dr. Harley pointed out the existence of the disease in Natal; a resident of this colony was under Dr. Harley's care, who daily passed hundreds of the characteristic ova. The disease appears to be confined to certain localities, and these are situated near the coast. How far the contamination of the two principal rivers of Natal

extends inland has not been determined, but the more elevated regions of the interior appear to be free from the disease. Dr. Rubidge, of Port Elizabeth, concludes, after careful enquiry, that the parasite gains access to the body in the act of bathing in the rivers. Dr. Harley believes that belladonna and hyoscyamus may exercise an injurious influence on the parasite, and by stunting its growth overcome it.

Dr. Hilton Fagge, in the Guy's Hospital Reports, discusses the pathology of *ichthyosis*. He corroborates the conclusion arrived at by Dr. Church, that "some cases, at all events, of ichthyosis spuria, or sauriderma, are due to an alteration and hypertrophy of the papillæ of the corium and their epithelium, and not to desiccated and altered sebaceous substance, as stated by Wilson." Dr. Fagge expresses grave doubts as to the existence of any form of ichthyosis, in the production of which an accumulation of sebaceous matter plays any but an insignificant part. He finds that the masses removed from the surface are made up of epidermic scales compressed together and arranged in lamellæ, the superposition of which produces conical papilliform masses, having a most delicate and beautifully striated structure. Besides the hypertrophy of the superficial epidermic lamellæ, he also finds that the cellular linings of the hair-sacs become greatly increased in thickness, and three or four separate hairs, all lying side by side, but having their roots at different levels, may be found one above the other; the root of each of these fine hairs is tufted. This tufted character of the roots of the hairs indicates that the hairs themselves have undergone the process of shedding; hence these hairs have all been formed in the same follicle, and have all successively been shed from it. The regular arrangement of their roots at different levels points strongly to this conclusion. These appearances suggest a question both new and of considerable interest. Granting that the crusts in this disease are formed of epidermic scales, is the development of such crusts to be ascribed to an excessive formation of these cells—a true hypertrophy, or to an abnormal adhesiveness and tenacity, enabling them to resist the influences which ordinarily remove the superficial layers of the cuticle, and to remain heaped the one over the other? Writers have generally assumed the correctness of the former of these hypotheses, but the facts observed appear to point rather to the latter. That several hairs formed successively within the same follicle should be found lying side by side—embalmed, as it were, in a single ichthyotic scale—would surely argue that this scale

must have been of very slow formation. In corroboration of this view is the statement that in the patient, on whom the above observations were made, there was very little tendency to the reproduction of the scales while he was in the hospital. Opposed to this view is the fact, that in many cases of ichthyosis the scales are formed very rapidly, as is shown by their constant shedding. Dr. Fagge, however, believes it will be found that this is more exceptional than is supposed, and that when it occurs it is often due to an inflammation of the skin, superadded to the ichthyotic condition.

Another character of ichthyosis, which has almost escaped the notice of dermatologists, is its association with an imperfect development, or stunting, of the body generally; and it follows from this that the cutaneous affection cannot be a mere local disease. Cases of so-called local ichthyosis will be found to be really examples of some other disease, *e.g.*, seborrhœa sicca.

Dr. Hilton Fagge draws attention to the peculiar change in the hairs in cases of *tinea favosa*. This consists essentially in the presence of a large number of tubes running in the interior of the hairs; in the root of the hair, into which they always penetrate, they appear as delicate transparent bodies, slightly wavy in their course, with a well-marked double contour, almost exactly like that of nerve-fibres. These tubes run towards the hair-bulb, and terminate just within it, in slightly bulbous, apparently closed extremities. These bulbous extremities of the tubes all lie at nearly the same level within the hair; some may project a little beyond the others, but they never advance very far towards the torn end of the bulb, nor has he ever seen such bulbous extremities in the shaft of the hair above the bulb. In the shaft of the hair the tubes retain a more or less distinct double contour, but they have lost their delicate succulent look, and appear dry and hard. Great importance may be attached to these fungus tubes lying within the hair, as accounting for the impossibility of curing most cases of favus without the most careful epilation.

Some affections of the nails form the subject of a paper by Dr. Hilton Fagge, in the "Guy's Hospital Reports." Among the general cutaneous affections which are liable to attack the nails, the principal are — syphilis, psoriasis, eczema, favus, ichthyosis, and rhinoderma (pityriasis pilaris). *Onychomycosis*, or parasitic disease of the nails, appears to occur under two distinct conditions: —1. The first of these conditions occurs in patients suffering from

some parasitic disease of the scalp or body generally, in which one or more of the nails become secondarily affected. This is most frequent in cases of favus. In these cases the fungus lies within the nail substance, being distinctly interstitial from an early period, and it gives a uniformly yellow colour to the part of the nail affected by it; the affection gradually extends, encroaching more and more towards the root of the nail. 2. The second condition under which the nails become affected with a vegetable parasite has been described by Meissner and Virchow. These observers discovered the disease *post mortem*, but Dr. Fagge records the first (with one exception) case in which a parasitic disease of the nails has been found during life in a patient not suffering from any parasitic affection elsewhere. The patient was 55 years old; his nails were thick and yellow at the edges, and more easily cut than natural. They were not all affected, but the disease was confined to the nails of the left thumb, middle finger, and forefinger, and those of the right thumb and little finger. Distinct evidence of the presence of a fungus was found in the scrapings of the nails; spores were seen, some aggregated together, some in short single or double chains. The affection was cured by the application of a lotion containing hyposulphate of soda, but the patient also took iodide of potassium internally.

Psoriasis affecting the nails often manifests itself by marking their surface with transverse grooves, which seem to indicate that the growth of the nails from their roots has taken place by fits and starts, and not uniformly, as under normal conditions. The nails may also be rough, brown, thickened, flattened, and striated longitudinally towards the free ends; they may also present yellow patches, resembling those of parasitic disease.

Squamous syphilide of the nails is also mentioned by Dr. Fagge. This is apt to accompany psoriasis palmaris and plantaris, but is comparatively rare. The nails may become concave, rough, and even of a black colour; they may become thick, black, rounded, narrowed, claw-like bodies projecting a quarter of an inch above the dorsal surface of the fingers. An outbreak of constitutional syphilis may also cause those curious transverse lines on the surface of the nails to which Dr. Wilks recently called attention, and which were first described some years ago by M. Beau.

Dr. Bäumler* records some observations concerning the best

* "British Medical Journal," August 21st, 1869.

method of ascertaining the *temperature of the body*. The first question he investigates is—How long ought the thermometer to remain in the axilla in order to give a correct result? He finds that a great difference exists in the rate at which the mercury rises, and of the time in which it reaches a fixed point, but no difference exists when the thermometers are inserted into a fluid of fixed temperature, the difference must therefore clearly depend on the place of application. In the case of the rectum the mercury rises much more quickly than when the thermometer is placed in the axilla, and this must be accounted for by the fact that the rectum, being a closed cavity, has a fixed temperature already at the commencement of the observation; whilst the axilla, not being permanently closed, has one temperature just when it is being closed, and another after it has been so for some time. Unless therefore the place of application has already a fixed temperature before the observation is made, the thermometer must be retained to a prolonged period in order that a scientifically accurate result may be obtained.

The time required for a thermometrical observation varies as to the locality in which the temperature is taken. This time is—

From 3 to 6 minutes for the rectum.

From 9 to 11 minutes for the mouth under the tongue.

From 11 to 24 minutes for the axilla.

The time can however be very materially shortened in the case of the mouth and of the axilla by keeping them closed for ten or fifteen minutes respectively previous to the introduction of the thermometer, the bulb of which has been warmed.

It is best to adhere to the rule laid down by Von Baerensprungt and adopted by Wunderlich, not to finish the observation as long as the mercury has not remained stationary during five minutes.

These conclusions do not apply to the use of the thermometer in every-day medical practice when scientific exactitude is not essential.

Dr. Finlayson,* of Manchester, from numerous observations on *the temperature of children*, concludes that,

1. The daily range of temperature is greater in the healthy child than that recorded in healthy adults. The amount of daily variations is from 2° to 3° Fahr.

2. There is invariably a fall of temperature in the evening amounting to 1, 2, or 3°.

3. The most striking fall usually occurs between 7 and 9 o'clock

* "Glasgow Medical Journal," February, 1869.

p.m., although it often begins about 5 p.m., and frequently continues till after midnight.

4. The minimum temperature seems usually to be reached at or before 2 a.m.

5. The temperature usually begins to rise between 2 and 4 a.m.

6. Fluctuations between 9 a.m. and 5 p.m. are usually trifling.

7. There seems to be no very definite, or at least obvious relation between the frequency of the pulse and respirations, and the amount of normal temperature.

Dr. Balthazar Foster,* Professor of Medicine in Queen's College, Birmingham, calls attention to the *temperature in diabetes.* He concludes—

1. That the temperature is always below the normal standard, the depression generally varying from one-half to three degrees (F.). In cases of recent origin the temperature ranges mostly between 96.5° and 97.5°, never mounting to, or beyond, the normal standard, except from some disturbing cause. In more advanced cases the temperature is nearly always below 97°, and occasionally falls as low as 94.5°.

2. That the temperature in the evening is (generally one-half to four-fifths of a degree) higher than in the morning of the same day. No exception to the evening elevation has been observed in cases of recent origin, but in a case of long standing the temperature has been occasionally noticed to fall in the evening.

3. That the variation in the quantity of sugar passed in twenty-four hours is not proportional to the rise and fall of the temperature of the body. The same temperature has been observed in the same cases to coincide with widely different quantities of sugar.

4. That the daily range of temperature bears no proportion to the quantity of sugar passed in the twenty-four hours. In two cases the administration of mixed diet for a few days was followed in each instance by a slight elevation ($\frac{1}{2}$°) of temperature and a diminished daily range; the morning temperature ceased to fall as much as usual. The sugar was much increased by the change of diet.

5. That the occurrence of pulmonary and other complications produces an elevation of temperature, but to a very limited extent. In one case in which well marked phthisis with local pleurisy existed the temperature was seldom higher than 99°, and only once did it reach 99.4°. In another case a bad whitlow only raised the temperature to 98.8°.

* "Journal of Anatomy and Physiology," May, 1869.

Chemistry.

Report by C. Meymott Tidy, M.B., *Lecturer on Chemistry at the London Hospital, etc.*

No great advance can ever be made in medical science until we more fully and honestly grasp the idea of the great one-ness of professional study. It is owing to the forgetfulness of this with many of her workers, that we have to deplore the slow, measured and lamentably cautious steps medicine takes towards becoming "an exact science." The true physician ought to be a chemist as well as a physiologist—an experimenter as well as a prescriber. He should remember that chemistry, physiology and medicine, are bound together with links and bands that no age can sever and no time can rust.

There probably never was a time when more real work was being done than at present, and yet we cannot fail to be struck with the fact how seldom physicians bring the investigations of the laboratory to explain and enlarge the work of the consulting-room. The meagre record of chemical work effected during the past year must be my apology for this assertion. If true progress in medicine is aimed at, it must result from no mere chance appearances about which two men may differ, but from cautious and accurate analyses of the several secretions in health and disease, about the accuracy of which no difference of opinion can possibly exist.

A most elaborate investigation into the effects of alcohol on the human body has been made by Drs. Parkes and Wallswicz.* The experiments were made by the authors on a healthy soldier who submitted himself to various systems of treatment. The following may be regarded as the conclusions at which the authors arrived.

1. That, other conditions remaining constant, alcohol has no power in adding to, or diminishing from the weight of the human body.

2. That alcohol produces but little change in the temperature in the axilla or rectum, but what effect there is, is rather in the direction of increase than of diminution.

3. The pulse is increased in frequency, and also in volume, by the action of the alcohol. The mean of all the observations gives

* "Experiments on the Effects of Alcohol (Ethyl Alcohol) on the Human Body." By E. A. Parkes, M.D., F.R.S., and Count Cyprian Wallswicz, M.D. "Royal Soc. Trans.," May, 1870.

73·57 beats per minute when water only was drank; 88·5 when alcohol, and 91·4 when brandy was taken. The effect moreover was persistent, lasting over six days.

4. From sphygmographic observations we gather, that alcohol increases the frequency of the ventricular contractions, and the increased rapidity of each contraction. The ventricle is therefore doing more work in a given time, the period of rest for the heart is much shortened, the blood moves more freely than usual through the capillaries, so that the increased quantity of blood which it is to be presumed is thrown into the arteries, is very quickly got rid of.

This action of the alcohol lasted for more than a week after it was discontinued.

We conclude therefore that the main action of alcohol in health is 1st, *on the ventricles* (increasing rapidity of contractions); 2nd, *on the capillaries* (the blood passing more rapidly through them because dilated).

5. Alcohol increases the quantity of urine secreted. (Was this due to the greater frequency of the heart's action, or was it due to the diuretic action of the alcohol?)

6. The effects of alcohol on the elimination of nitrogen is not great. If any change does occur (and unfortunately Dr. Parkes's experiments are not very satisfactory on this point, owing to a febrile attack occurring during the investigations), it is to increase the amount of nitrogen eliminated.

7. The amount of phosphoric acid eliminated is not influenced by alcohol. The amount of chlorine and the acidity of the urine is increased during its exhibition.

8. The alcohol neither lessened the total amount of the alvine discharges, nor the quantity of nitrogen eliminated thereby.

9. The authors find that alcohol is eliminated by the lungs, by the skin, by the kidneys when over 1 fluid ounce is taken in the 24 hours, and also by the bowels, but in a very much less degree. They consider that the action of the alcohol is more prolonged than is generally conceived, but whether it all passes off, or whether some is destroyed, their experiments have not enabled them to state.

10. When alcohol is given in small doses the appetite is increased, but if beyond a certain point it is almost entirely destroyed. Two fluid ounces of absolute alcohol the authors believe to be the limit of its useful action on appetite.

From results deduced from observations during six years on the luminosity of phosphorus in connection with atmospheric conditions,* it appears that periods of phosphorescence and ozone periods commence, continue, and terminate under the same atmospheric conditions; that phosphoric ozone is formed only when phosphorus is luminous; and that increase of temperature and low atmospheric pressure are favourable to luminosity, while low temperature and high atmospheric pressure are unfavourable to it.

While the readings of the barometer are increasing, and the wind is veering towards the N. points of the compass, phosphorescence diminishes in brilliancy and ozone in quantity; and, while the polar current continues, the barometer attains its maximum, the wind veers from N. to E., phosphorus becomes non-luminous and ozone disappears. If, when the wind has veered to the E., the barometer readings began to decrease, the wind sets in from points by S., phosphorus becomes luminous and ozone appears; and while the south or equatorial current continues, the barometer readings fall to a minimum, the wind veers from S. to W. points, phosphorescence becomes brilliant, and ozone is in maximum quantity. Liquid and gaseous bodies, when in contact with phosphorus in a non-luminous state, become phosphorated, and they, under suitable conditions, become phosphorescent and ozonised, the temperature at which phosphorescence takes place varying with the pressure of the atmosphere.

As venous blood contains phosphorus (phosphorated fat) which, when coming in contact with the oxygen of the air during respiration is converted into phosphoric acid (the blood, perhaps, being ozonised at the same time) and combines with the alkalies and earths in the liquor sanguinis, and forms phosphates of soda, magnesia, and lime, it appeared not unreasonable to suppose that the quantity of phosphorus oxidated and phosphates formed in the system, and eliminated from it through the kidneys, is in some degree determined by the pressure and temperature of the atmosphere, and the state of the weather generally.

With a view to ascertain the quantity of phosphoric acid excreted by the kidneys, the urine of a healthy man was tested daily for

* "On the Oxidation of Phosphorus and the Quantity of Phosphoric Acid excreted by the Kidneys in connection with Atmospheric Conditions." By J. Moffat, M.D. "Chemical News," October 1st, 1869. [Read before the British Association at Exeter.]

twelve months. The quantity of urine evacuated in twenty-four hours was measured daily, and the quantity of phosphoric acid in one ounce of it ascertained. The man was of abstemious habits. His food seldom varied in kind or quantity. It consisted of tea, bread and butter, eggs, animal food, rice, oatmeal, and milk. The two articles in excess were bread and milk; of the latter he took at least three pints daily. The readings of the barometer and thermometer, the quantity of atmospheric ozone, and the direction of the wind, were recorded daily, the results were deduced monthly, and tabulated as below.

TABLE I.

Showing the mean quantity of phosphoric acid excreted by the kidneys, when—

The barometer was					The temperature was		Ozone was		Phosphorus was		The wind was			
Increasing.	Decreasing.	Above 30 in.	Above 29 in., and below 30 in.	Above 28 in., and below 29 in.	Increasing.	Decreasing.	Present.	Absent.	Luminous.	Non-luminous.	N. to E.	E. to S.	S. to W.	W. to N.
grs.	grs.	grs.	grs.	grs.	grs.	grs.	grs.	grs.	grs.	grs	grs.	grs.	grs.	grs.
58·8	62·8	53·6	57·5	67·5	62·4	61·4	62·0	56·0	60·0	57·0	56·8	59·5	62·0	61·4

From these results, then, it would appear that the maximum quantity of phosphoric acid excreted from, and in all probability formed in the system, occurs with the conditions of the equatorial or south and ozoniferous current of the atmosphere, and the minimum quantity occurs with the conditions of the polar or north and non-ozoniferous current. The results of the observations for each month were similar to those in the table, with the exception of March and May.

In March there were 2 grains more of daily mean with increasing than with decreasing readings of the barometer; and in May the quantities were equal for both sets of readings. The range of the barometer for March and May was 1·247 ins. only, while for August and November the range was 1·532 in.; and the difference in the quantities of phosphoric acid excreted was a daily mean of 12 grs. more with decreasing than increasing readings. When the range of the barometer for the month is above 1·5 in., the difference in the two sets of readings is 6·8 grains more with decreasing than increasing readings; and when the range is less than 1·5 in., the

mean difference between the two sets of readings is 3·4 grains more only for decreasing than increasing readings.

During the months from October to February (both inclusive), that is, during the months in which the temperature of the air is owing more to atmospheric than solar influence, a piece of phosphorus was kept in a dark cellar. It was examined daily, and the quantity consumed or oxidised was ascertained monthly. The results are given in the following table:—

TABLE II.

Showing that when the mean monthly reading of the barometer was—

Between	The quantity of phosphorus oxidised was	The mean daily quantity of ozone was	The No. of ozone days was	The mean daily quantity of phosphoric acid excreted was
inches	grs.			grs.
29·0 and 29·5	41·3	2	18	62·5
29·5 „ 30·0	20·0	1	8	55·6

From this it would appear that the amount of phosphorus oxidised in the air, and the amount oxidised within us, depends upon similar atmospheric conditions. The readings of the barometer, which lead to the issuing of cautionary (Admiral Fitzroy's) telegrams, are of course decreasing. Ninety-four per cent. of the telegrams are accompanied by the commencement of periods of phosphorescence. Atmospheric ozone invariably appears or increases in quantity with them. The mean daily quantity of phosphoric acid, excreted by the kidneys on the day before the telegrams, is 65·3 grains, and on the day of it, 63·9 grains, giving a mean of 64·6 grains, which is 3½ grains daily above the mean.

The diseases which accompany the meteorological changes, which appear to lead to the foregoing results, must be left for further discussion.

The following were the results of the analysis of the urine in six typical cases of relapsing fever, from the wards of the London Hospital: *—

* "On the Urine of Relapsing Fever." By C. Meymott Tidy, M.B. ("Lancet," 1870.)

No.	Temp.	Sp. gr.	Total solid pr. 1,000 gr.	Chlorides pr. 1,000 gr.	Uric acid pr. 1,000 gr.	Urea pr. 1,000 gr.
1	99°	1024	45·8	—	—	9·8
2	106	1024·2	42·7	6·48 (P)	1·08	18·8
3	101	1021·2	33·1	3·12	1·11	10·6
4	108	1016·8	30·3	1·14	0·48	13·2
5	99	1023	32·2	2·68	0·83	9·64
6	107·5	1008·6	12·1	1·00	0·68	12·8

In the cases where the temperature is very high (Nos. 2, 4, and 6), the amount of urea is very large, and the chlorides correspondingly small, with one exception, where the chlorides seem to be present in a most unusual quantity.

In those cases where the examination showed a lower temperature (Nos. 1, 3, and 5), the urea is diminished in quantity, and the chlorides are increased.

The amount of uric acid is very variable, possibly differing according to the peculiarities of each case.

On the Solvent Treatment of Uric Acid Calculus and the Quantitative Determination of Uric Acid in Urine,* *by the* Rev. W. V. Harcourt.†

When the British Association met at Manchester, in 1861, Dr. Roberts, Physician to the Royal Infirmary of that city, communicated a paper respecting "The Power of Strong and Weak Solutions of the Alkaline Carbonates on Uric Acid Calculi," ‡ in which he showed the fallacy of the experiments supposed to have proved their inefficacy in a report formerly made to the French Academy by MM. Gay Lussac and Pelouze.

Dr. Roberts found that solutions of the carbonated alkalies containing more than 120 grains of the salt in a pint of water arrested their own action by forming an insoluble crust of biurate on the calculus, and that the maximum of solvent power lay in solutions which contain 50 or 60 grains in the pint. At this strength, no incrustation was formed when the carbonate of potash was employed; and 21·4 grains per cent. of the weight of the calculus were removed by a flow over it of 6 pints in twenty-four hours. The carbonate of soda followed the same general course, with inferior efficacy.

In 1865, Dr. Roberts communicated to the Royal Medical and Chirurgical Society of London § a paper in which he showed, by a

* Read before the British Association, Exeter meeting, Section B.
† "Chemical News," October, 1869.
‡ "Report of the British Association, Manchester, 1861," p. 90.
§ "Medico-Chirurgical Transactions," vol. xlviii., p. 89.

series of well-devised experiments, how this discovery might be applied, with a reasonable prospect of advantage, to medical practice; and laid, for the first time, a scientific basis for attempts hitherto empirical and contradictory at dissolving the stone. The most remarkable of these experiments was that in which he passed the urine of a patient who was taking citrate of potash at the rate of 40 grains in 5 ounces of water every two hours over a fragment of uric calculus, and, by this process, reduced it in twelve hours from 180·5 to 174 grains, or at the rate, in twenty-four hours, of 13 grains.

In July, 1868, I was made aware, by an eminent surgeon, Mr. Spencer Wells, of the presence of a stone in the bladder, one diameter of which appeared to measure 1½ inches; and I was advised by Mr. Wells (and by Sir H. Thompson, who confirmed his opinion as to the size of the stone) to aim at preventing its enlargement by such doses of citrate of potash as might keep the urine in a state approaching neutrality. In conversation with my excellent friend, the late Mr. Hodgson, who, when surgeon to the Birmingham Hospital, had had great experience in this complaint, I learned that he had met with so much success in the application of an empirical medicine of much celebrity, manufactured in that neighbourhood, and consisting of carbonates of potash, that, in any case of uric acid calculus, he would advise the experiment of its administration.

Mr. Wells afterwards drew my attention to the experiments of Dr. Roberts, which appeared so satisfactory that I determined to make trial of his method of treatment, and to ascertain, if possible, by chemical analysis, the excess of uric acid above the normal quantity contained in the urine which it might be considered as removing from the calculus.

I felt the great importance of the inquiry, and had the advantages of more than ordinary leisure, a long familiarity with chemistry, a well-furnished laboratory, and an assistant in executing the experiments on whose accuracy I could fully rely.*

I will now proceed to lay before the Section a short abstract of the chief results which I have obtained from an unintermitted course of careful experiments on all the urine voided during the past twelve months, some of which will be found of value to future experimenters, though, from causes which I shall describe, they have not realised all my expectations. If, as I had supposed, there had been any known chemical method of determining, with a near approach to accuracy, the amount of uric acid in urine, then the quantities of that acid which Dr. Roberts found to be removed from calculi out of the body were abundantly sufficient to be ascertained by analysis, on the supposition that the same process went on in the bladder under the treatment recommended by him. I had scarcely, however, commenced my course of experiments before I became convinced of the fallibility of the methods in use for

* My assistant, Mr. W. P. Horn, learned, in Sir Benjamin Brodie's School of Chemistry, in Oxford, those habits of precision in manipulating and accuracy in observing which are essential to chemical experiments.

separating uric acid; and the experiments which I have to describe will place that fallibility in a strong point of view.

The method first employed was the ordinary one of adding 5 per cent. of hydrochloric acid, allowing the mixture to stand forty-eight hours, and then, after decantation, collecting the uric acid on a small filter, washing it with distilled water, and drying it at 212° F. till it ceased to lose weight. The first seven determinations, from the 20th of August, 1868, to the 26th, inclusive, were made each day on the urine of the preceding twenty-four hours, in a neutral or slightly alkaline state, brought to that state by doses of from 120 to 165 grains of citrate of potash. The quantities of uric acid obtained varied from 11·08 to 8·43 grains. In the subsequent daily determinations, down to the 5th of September, acid reactions were interpolated, due to the use of smaller alkaline doses, which lowered, proportionably, the amount of uric acid obtained; and, when no alkali had been taken for two days, and the urine was, in consequence, strongly acid, the quantity of uric acid found was only 2·35 grains.

From this time commenced a course of large quantities of citrate of potash, amounting, during fourteen days, to 315 grains in twenty-four hours, taken in a state of effervescence, in doses of 45 grains, dissolved in 3 fluid ounces of water. For ten of these days the hydrochloric acid was used to precipitate the uric acid; and the determination of this gave from 11·95 to 6·00 grains. In every case but the last the whole urine of the twenty-four hours had been used; but, in the last, half was treated with hydrochloric acid, and the other half with the same proportion of nitric acid: that treated with the former acid gave 6·42 grains, whilst that with the nitric acid gave only 1·97 grains. On the following day, half the urine was treated by Lehmann's process, and gave 6.40 grains; half with nitric acid and acetic acid, in equal proportions, which gave 4·09 grains uric acid. The preference, however, assigned by Dr. Thudichum, in his able and well-known treatise on the "Pathology of the Urine," to nitric over hydrochloric acid, as having given him better results, led me to continue its use.

The quantity of citrate of potash taken was then raised to 350 grains for four consecutive days. On the first of these days, the uric acid found was 1·54 grains; on the second, 1·23 grains. These results were so extraordinary, that, for the purpose of corroborating them, or discovering an error in the analysis, I sent 40 fluid ounces out of 61 fluid ounces voided on the latter day to Dr. Thudicum, who was so good as to furnish me with his analysis of it, containing the weights of sulphuric acid, phosphoric acid, chlorine, potash, urea, and uric acid which he had obtained. The uric acid amounted to no more than 0·775 grains.

This result led to one of two conclusions. Either independently of any question of the solution of the calculus, the presence of uric acid in the bladder had been almost entirely prevented by the alkaline treatment, or the process for obtaining it was altogether unreliable. Taking the latter alternative as far the more probable, I endeavoured thenceforward to improve the analysis. The mucus secreted from the bladder by the alkaline action being now a good

deal in excess, I was advised that it would be prudent to diminish the quantity of alkali taken; and it was accordingly reduced for five days to 300 grains of the citrate, and for eight days to quantities varying from 270 to 240 grains. The alkalinity was now determined for every voiding with hydrochloric acid. 2·5 per cent. of that acid was added to each; and, as it had been observed that uric acid was lost by decantation however careful, the portions of urine operated upon were entirely filtered, and the water with which the precipitates were washed was acidified with acetic acid. Under this treatment, on the fifth day of taking 300 grains of citrate, the alkalinity, measured by a standard solution of hydrochloric acid and estimated in grains of carbonate of potash, was 25·5 grains per pint. The uric acid obtained weighed 4·74 grains; and the series below 300 grains of citrate gave quantities of uric acid varying from 2·91 grains, the alkalinity being 23·05 grains per pint, to 8·42 grains, the alkalinity being 17·2 grains per pint.

One-half of that which, with 2·5 per cent. hydrochloric acid, had yielded 8·42 grains was treated with 5 per cent. nitric acid, and kept at the temperature of 90° F.; and, to render the experiment analogous to Dr. Thudichum's analysis, the alkalinity and dilution were brought to a similar standard by additions of carbonate of potash and water. The uric acid thus obtained weighed 2·07 grains, showing a loss, by this method, of 6·35 grains.

The table on page 278 contains an account of the uric acid obtained on the thirty-five days from October 9th to November 12th, inclusive, as well as of the potash taken, and the quantity and alkalinity of the urine.

In this table, the highest quantity of uric acid, 12·2 grains, is connected with an alkalinity of 4·2, while the lowest quantity, 3·2, was obtained when the alkalinity was as high as 35·4. Twenty days, in which the alkalinity of twenty-four hours varied from 19·2 to 40·3, gave an average of 7·94 grains; whilst fifteen days, when the alkalinity was from 19·1 down to 1·4, gave an average of 8·08 grains. These data would lead to the supposition that the alkali had exercised no action on the calculus; but, on the other hand, the great and sudden rise of the uric acid, when the alkalinity descended from 22·1 to 4·2, might raise a suspicion that the alkaline treatment may reduce the secretion of uric acid, and in that case, the absence of solvent action cannot be inferred.

A good deal of blood passed with the urine from the 13th to the 16th of November, accompanied with some diarrhœa and sickness. On the 17th, the determination of the uric acid was resumed; the alkalinity on that day being 5·3; the uric acid was 11·55 grains. On the following day, the acidity being 10·8, the uric acid was 10·3 8 grains.

I now instituted some new experiments, on the effect which different degrees of dilution in urine produce on the separation of uric acid. On November 19th, 40 grains of citrate of potash having been taken, the urine voided in twenty-four hours amounted to 31 fluid ounces; it was neutral; the sp. gr. was 1·032. It was divided into three equal portions;—one-third in the natural condition, treated in the usual manner with 2·5 per cent. hydro-

Citrate of Potash.	Alkali, per pint.	Uric Acid.	Urine voided in ounces.
220	16·3	6·9	51·4
20	16·8	5·6	46·6
10	22·1	8·1	40·6
255	4·2	12·2	49·7
240	19·1	7·9	47·1
240	21·3	10·6	50·7
240	30·9	9·3	55·1
225	20·0	8·4	51·9
260	36·2	6·4	46·4
270	19·5	5·5	59·0
230	18·4	6·5	56·5
240	16·8	9·1	60·7
270	22·6	7·1	53·5
270	29·0	6·6	63·5
255	27·5	8·4	59·7
285	35·4	3·23	62·5
255	40·3	7·1	52·0
240	29·4	9·6	52·0
240	19·8	8·8	52·9
225	23·3	8·7	60·3
140	10·0	11·9	64·7
140	5·0	5·1	57·2
120	1·4	4·9	44·0
120	4·2	6·4	45·0
25	5·2	7·8	51·5
185	7·6	8·4	52·5
225	26·3	7·3	51·5
210	17·4	9·7	61·9
210	22·0	7·3	64·5
210	16·4	8·3	76·4
210	19·2	8·5	42·5
210	19·5	9·4	51·4
210	19·8	9·9	63·5
195	21·3	7·6	53·5
180	21·2	11·6	55·5

chloric acid gave uric acid at the rate, for twenty-four hours, of 11·78 grains; one-third, diluted with its own bulk of water, and of sp. gr. 1·022, treated in like manner, gave uric acid 10·99 grains; one-third, evaporated down to half its bulk, and then heated with the same quantity of hydrochloric acid, gave, uric acid, 13·81 grains. November 22nd. 180 grains of citrate having been taken, the alkalinity being 1·96, and the sp. gr. 1·030, the urine for the twenty-four hours, amounting to 41·5 fluid ounces, was divided into two portions, one of which, in the natural condition, gave 12·32 grains, the other, concentrated to one-third, sp. gr. 1·070, gave 14·78 grains of uric acid. On the 23rd, the same quantity of citrate being taken, the alkalinity, 18·05, sp. gr. 1·028, the quantity of urine, 42 fluid ounces, one-half in the natural condition, gave 12·72; the other half, concentrated to one-fourth, sp. gr. 1·072, gave 14·94 grains of uric acid. On the 24th, the same quantity of citrate being taken, the alkalinity, 20·4, sp. gr. 1·030, the quantity of urine 35 fluid ounces; one-half, in the natural

condition, gave 10·318; the other half, concentrated to one-fourth, sp. gr. 1·074, gave 12·135 grains of uric acid. On the 25th, the same quantity of citrate being taken, the alkalinity, 21·2, sp. gr. 1·031, the quantity of urine 43 fluid ounces; one-half, in the natural condition, gave 9·94 grains; the other half, concentrated to one-fourth, sp. gr. 1·075, gave 11·02 grains of uric acid. Again, on the 30th, 135 grains of citrate having been taken, the alkalinity, 37·6, the quantity of urine, 40 fluid ounces; one-half, in the natural condition, gave 8·53; the other half, concentrated to one-third its bulk, gave 12·66 grains of uric acid.

These give very nearly the two extremes of difference in forty comparative experiments, in the last fifteen of which the urine was reduced to a standard volume of 6 or 3 fluid ounces, according as half or quarter of the urine was employed; the average difference in these fifteen was 3·03, and in the former twenty-five, reduced to the proportions above described, 3·09 grains. What was the cause of the variation in the differences does not appear; it occurred equally, whether the urine was acid or considerably alkaline.

It follows, I think, from these experiments, that, to any average quantity of uric acid obtained from an unconcentrated urine, 3 grains may be added; and the last experiment described in this paper makes it probable that the employment of a better method of analysis may increase this augmentation.

I was not satisfied, however, that sufficient accuracy of analysis had yet been obtained, and I have since employed the following process, which promises more perfect results:—A fourth of the urine of twenty-four hours is evaporated to 3 fluid ounces; it is treated with a mixture of hydrochloric acid and alcohol in equal parts, each being 2·5 per cent. of the quantity of urine employed; it is allowed to stand for forty-eight hours, drained on a small filter, washed with alcohol (methylated spirit), and then with equal parts of acetic acid and water. The colouring matter and phosphates, etc., are thus removed, and the uric acid is of a light colour and perfectly, though confusedly, crystalline.

The advantage which this method possesses over those heretofore in use is shown in the experiment which follows:—In urine, having an acidity of 5 grains per pint, the nitric acid method of Dr. Thudichum gave 1·16 grains of impure uric acid; the ordinary hydrochloric acid method gave 5·53 grains; the method above described gave 9·90 grains of uric acid. I have found this method equally effective in the treatment of acid urine neutralised by potash, and am inclined to believe that it might be not less applicable to that which contains a greater amount of chloride of potassium.

On the whole, these experiments, though they have failed to realise my expectation of testing by analysis the effect of Dr. Roberts's solvent treatment on vesical calculus, may serve to point out to others the road to success in such an attempt; and if they do so, the labour of a twelvemonth will not have been spent in vain.

There is one prominent chemical fact attending these experi-

ments which remains to be noticed—viz., the greater amount of uric acid obtained before the alkaline treatment commenced, than in the last experiment by the same process, in the proportion of 9·56 to 5·53 grains. A similar diminution has taken place in the mineral acids; whilst from 120 to 150 grains of citrate of potash were required for neutrality in August, 1868, in March and April, 1869, from 30 to 60 grains sufficed for the same purpose. Dr. Thudichum's analysis, in September, 1868, gave — of sulphuric acid, 51·1 grains; of phosphoric, 45·7 grains. The analysis made in my laboratory, in March, 1869, gave—sulphuric acid, 25·9, of phosphoric, 34·2 grains, a difference scarcely to be accounted for without reference to the alkaline treatment undergone in the first three months of the interval.

Though I have been unable to produce any *chemical* evidence in favour of the solvent treatment, a fact observed during the whole course of that treatment, and not afterwards, persuades me that a solvent action was really going on. This fact consisted in a small amount of constant deposit, in which fragmentary particles of uric acid were discerned by the microscope enveloped in mucus, and bearing, in the opinion of Mr. Wells, as well as my assistant, a close resemblance to the detritus left by the incomplete action of carbonate of potash on fragments of uric acid calculi. I suppose these to have been washed out of the bladder in consequence of a partial solution. That no such solution should have been brought into evidence by the many determinations of uric acid, however imperfect, which I have here described, if it cannot be fully accounted for by that imperfection, may possibly be due to a physiological effect of the alkaline treatment in preventing the formation of uric acid, which may have counterbalanced the excess expected from solution of the calculus. This point, a course of experiments which need not be very long, conducted by a process of analysis reliable within a tenth part of the weight of uric acid obtained, ought hereafter to determine.

My experience of the effect of doses of 300 grains of citrate of potash taken in twenty-four hours has convinced me that no disadvantage to health need be dreaded from such a course. I have not suffered so much from dyspepsia during the last twelvemonth as in many former years. Bleeding from the bladder has, indeed, supervened twice, but without any pain or irritation, and I have had no other symptom of the complaint; and this is the experience of a man of eighty years of age, who has been for some years an invalid.

P.S. I have omitted to state that the calculus was judged to be uric from the previous passage of crystals of uric acid. Since the alkaline treatment, the urine has been perfectly clear, free from all deposits. It was never ammoniacal when voided, and contained no albumen.

PROPERTIES AND ESTIMATION OF ALBUMEN. From "Quantitative Analysis," by Professor STORER.

Principle I.—Coagulability by heat.

Applications.—Estimation of albumen in alkaline solutions, such as urine and the serum of blood.

Method A.—Acidulate the solution slightly with acetic acid, and boil for several minutes. Collect the precipitate on a tarred filter, wash thoroughly with warm water, and dry in a current of warm air at 110° or 115°, or, better, *in vacuo*, over sulphuric acid, until the mass ceases to lose weight. Care must be taken that the precipitate is thoroughly dried; for, as soon as the moisture has been driven from its surface, the mass acquires the consistence of horn, and forcibly retains the last portions of the water. The addition of acetic acid to the liquid is essential, in order that the albumen shall be precipitated completely; but no great excess of the acid should be employed, lest some of the albumen be dissolved by it. The precipitate thrown down from solutions thus acidulated, is more flocculent, and less apt to clog the pores of the filter during the process of washing than that obtained without the addition of an acid.

To determine albumen in urine, place 50 to 100 c.c. of the clear urine (previously filtered, if need be) in a flask large enough to hold twice as much of the liquid. Heat the liquor gradually, with frequent shaking, until the albumen begins to coagulate, at about 70°; then throw a couple of drops of acetic acid into the flask from the end of a glass rod, and boil the liquor as above described (Neubauer and Vogel).

Method B.—Another method of estimating albumen in urine, devised by Heller (Heller's "Archiv. für Chem. und Microsc.," 1852, p. 266, *et seq.*), is said to afford very accurate results, in spite of being indirect:— Evaporate ten or fifteen grammes of the urine to dryness over sulphuric acid, and weigh the residue. Weigh out another quantity of the same urine in a small flask; acidulate it slightly with acetic acid; boil until all the albumen is precipitated; and, after the liquid has become cold, place the flask upon the balance, and add to it, drop by drop, water enough to replace what has evaporated. Filter the contents of the flask, and evaporate a weighed portion of the filtrate to dryness over sulphuric acid. The difference between the percentage of residue left by the original urine and that obtained from the urine after the separation of the albumen gives the proportion of the latter ingredient.

Method C.—For comparing the quantities of albumen in any two different samples of urine, Dr. John Harley has adopted the following process:—Make three small filters from the same sheet of paper; cut down the two heavier to the weight of the lightest, and mark the filters with a pencil, A, B, and O. Take 1000 grain measures of urine A, and, having boiled it, pour it, while hot, upon filter A. Treat urine B in a similar way. Wash the contents of each of the filters with warm water, until the last traces

of adhering urine have been removed. Then pour upon the albumen an ounce of water containing two drops of nitric acid, and subsequently wash out the acid with water. The filter marked O is placed, in the first instance, between one of the other filters and the funnel, and is thus equally saturated with urine and acid, and equally washed free from both. All three filters are dried together; and the empty filter is used as a counterpoise in determining the weight of the albumen upon the others.

Properties.—Albumen, as it occurs in the state of solution in the animal economy, is combined, not only with water, but with minute quantities of certain saline and alkaline ingredients. When a solution of pure albumen is evaporated, *in vacuo*, at temperatures below 50°, there is left a light yellow, translucent mass of soluble albumen, which may be readily rubbed to a fine white powder. When treated with water, this residue swells up to a jelly, without, however, dissolving to any very considerable extent, unless a small quantity of an alkaline salt be present. By the action of most mineral acids, and of many other chemical agents (sometimes by mere contact with atmospheric air), this soluble modification of albumen is changed to the coagulated, insoluble condition.

Insoluble albumen, when recently precipitated, and still moist, is a tough, white, opaque, flocculent solid, insoluble in water, alcohol, ether, and most acids, when dilute and cold. When left moist in the air, it putrefies. It is somewhat soluble in hot acetic, tartaric, phosphoric, and strong chlorhydric acids. When boiled for a long time with water, it decomposes and dissolves. On being dried, it assumes a yellow colour, and becomes brittle and translucent, like horn. When soaked in water, after drying, it takes up above five times its weight of the liquid, and becomes soft and elastic.

Principle II.—Opacity.

Applications.—Estimation of albumen in aqueous and saline solutions.

Method.—Prepare a little trough of sheet-iron, with glass ends, as follows:—Provide three rectangular sheets of metal, one 7 c.m. square, the others 4 c.m. long by 2·5 c.m. wide. Bend the square sheet into the form of a V-shaped gutter, the upper edges of which are 1 c.m. apart. From each of the smaller sheets cut out wedge-shaped pieces of metal corresponding to the shape of the trough, so that, when the sheets are placed in an upright position, the V-shaped trough may fit into the cuts, and be supported as by feet. Place one of these supports near each end of the trough, and solder them to the trough. Cut out two V-shaped pieces of window glass, fitted to the trough, and cement them into the ends of the trough with Canada balsam, taking care to place the glasses parallel to one another, and to leave a clear distance of 6·5 c.m. between them. The glasses can be cemented the more readily in case a notch or groove be made upon the iron in the beginning to receive them. The metal of the trough should be painted with asphaltum varnish, to protect it from rust.

As applied to the estimation of albumen in urine, the process of testing is as follows:—Filter the urine, in case it is not clear,

acidulate it slightly with acetic acid, if it be not already acid, and proceed to determine how much the urine must be diluted to fit it for the test. To this end prepare several dilute solutions by mixing measured portions of the urine with water, and boil each of the solutions in regular order, until one is found in which the albumen no longer separates in distinct flocks, but only as a milky cloud. It is a liquid thus clouded by the presence of fine particles of suspended albumen, which admits of being subjected to the test of opacity.

The best way of preparing these dilute solutions is the following:—By means of a little pipette graduated to 0·1 c.c., take up 6 c.c. of the urine and transfer it to a 100 c.c. flask. Fill the flask with water to the mark, shake the mixture thoroughly, pour the liquid into a beaker, and leave the flask inverted, in order that it may drain. Meanwhile pour 6 or 8 c.c. of the diluted urine into a test-tube of 20 or 25 c.c. capacity, heat the liquid to boiling, and aferwards cool it quickly by immersing the tube in cold water. In case the precipitate produced by boiling is so slight that the form of objects placed in strong daylight can be distinguished on looking at them through the liquid, the sample has been too much diluted, and the operator will at once proceed to prepare a more concentrated solution by mixing 12 c.c. of the original urine with water in the 100 c.c. flask. But in case the first solution was not transparent, it may be tested in the trough.

In testing, fill the trough two thirds full of the cold boiled liquid, and look through the liquid at the flame of a burning candle in a darkened room. Repeat the experiment with other diluted samples of the urine until a point is reached where the shape of the flame cannot be distinguished, and only diffused light can be seen through the liquid, even when the candle is brought close to the trough.

In case the flame is visible through the first solution, the next trial must be made with a solution containing a few more per cents. of urine than the first. But if the shape of the flame cannot be distinguished, the liquor of the subsequent trial must be more dilute, and so on methodically, until a liquid is obtained through which the reddish yellow cone of flame can only be seen by looking with the strictest attention, as if it were in a thick fog. When this point is reached, it is only necessary to add a trace more urine (0·1 or 0·2 per cent.) in preparing the next diluted sample, in order that the flame may become completely invisible, and the operation be finished.

To find the percentage of albumen, divide the number 2·3553 by the number of c.c. of urine taken to prepare the dilute solution through which the flame could no longer be seen. This number 2·3553 is the mean of 35 experiments by Dragendorff, in which the results of the optical test were controlled by precipitating and weighing the albumen.

Precautions.—In looking at the flame the trough should be held before the eye like a spy-glass, and moved forwards and backwards from a distance of 0·5 metre from the candle close up to the flame, while the instrument itself is continually pressed lightly

against the eyebrow. Up to a certain point the last glimpses of the cone of flame can be seen more readily, in proportion as the trough is closer to the candle, but if the flame is too near the liquid, the latter is illuminated by a reddish yellow light, through which the flame is seen less readily. The chamber in which the operation is conducted should always be dark enough that the yellow light of the candle may overpower the daylight.

In case albumen separates from a diluted liquor in small flocks, the liquor may often be made cloudy and fit to be tested by shaking it violently as soon as the flocks appear. Densely clouded liquids, on the other hand, may be used for preliminary approximate tests, by mixing them with measured quantities of water. But the results of such experiments must always be controlled by testing samples of urine which have been diluted before boiling. Better results can always be obtained by boiling weak solutions of albumen than by boiling comparatively strong solutions and mixing the cloudy liquor with water.

Instead of the 100 c.c. flask above prescribed, a 50 c.c. flask may be used, but rather more accurate results can be obtained when the larger volume of liquid is operated upon. The pipette employed must be graduated to 0·1 c.c. so that quantities of liquid as small as 0·05 can be measured with it.

The chief difficulty of the process is found in endeavouring to properly acidulate the original urine. Many samples of albuminous urine yield no precipitate, or only a comparatively feeble precipitate on boiling, when too strongly acidulated with acetic acid, and, in like manner, less albumen is obtained by the optical test than by the method of precipitation, in case the acid reaction of the urine is indistinct. It is important that the urine should be kept in a cool place, in order that it may be as fresh as possible when tested.

The original urine need not be filtered unless it contains a distinct precipitate. Urine that is merely cloudy will usually become clear when mixed with much water. Some samples of albuminous urine, however, become cloudy when treated with a few drops of acetic acid, or with five or ten times their volume of pure water, and it is precisely this kind of urine which is least readily tested by the optical method. Special care must be exercised in adding acid to such urine, since the presence of a trace of acetic acid in excess may present the appearance of any precipitate on boiling. The cloudy solution (paralbumen) produced on mixing the urine with water need not be filtered. The mixture should be boiled at once, as if it were clear.

The process is easy of execution, and is said to yield very accurate results, excepting perhaps those kinds of urine which become cloudy on the addition of acetic acid. Ordinarily no more than five or six of the diluted samples of liquid have to be tested in order to hit the point of obscuration, so that the determination will be finished in the course of half an hour.

The several experiments of the series above mentioned agreed with one another in most instances to the second decimal place. Only three experiments out of the thirty-five differed more than

0·1, and only 11 more than 0·05, so that 21 of the trials agreed to 0·05 per cent. (Alfred Vogel, "Zeitsch. analyt. Chem.," 1868, vol. vii., p. 152).

Principle III.—Power of rotating the plane of vibration of a ray of polarised light.

Applications.—Estimation of albumen in aqueous or saline solutions, such as urine and the serum of blood.

Method.—When a ray of polarised light is made to pass through a column of albumen solution enclosed in a tube, it is found that the plane of polarisation is rotated to the left, and that the angle of deviation is proportional to the length of the column of liquid. In like manner, when a tube of any given length is successively filled with solutions containing different quantities of albumen, the angle of deviation is found to be proportional to the amount of albumen in the liquid.

An apparatus, known as Soleil's Albuminimeter, used for measuring the rotatory power of albumen, resembles the ordinary Saccharimeter, with the exception that, in place of the Nicol's prism there used as the analyser, a double refracting prism is employed, cut in such manner that only a single image shall appear in the field of vision. An intense white light, such, for example, as that of a petroleum lamp, is needed. The lamp is placed in a blackened box provided with a reflector, which throws the rays of light upon a moveable lens, by which they are concentrated before reaching the apparatus.

After the lamp has been lighted and placed in front of the apparatus, put a piece of red glass in front of the polarising prism in the path of the luminous rays, and turn the analysing prism until the luminous image has completely disappeared. The zero point of the apparatus having thus been determined, fill the tube with the solution to be tested, place it in the apparatus, and leave the liquid at rest during some minutes. On again looking into the apparatus it will be seen that, by virtue of the rotatory power of the liquid in the tube, the luminous ray has again become visible, and it will be found that the index of the apparatus must be turned through a certain number of degrees in order to again extinguish the ray. But by counting the number of degrees and minutes between the two points of extinction, it is easy to determine the amount of the rotation and to estimate therefrom the proportion of albumen in the liquor.

It is important to exclude external light as completely as possible; to make several observations with each sample of liquid, and to read the divisions of the circle and vernier carefully, best with a good lens.

In case serum of blood is to be tested, about 1 grm. of sulphate of sodium should be added to each 100 grms. of the liquid, and the mixture filtered immediately, in order to separate blood globules and other suspended particles. The purpose of the sulphate is merely to facilitate the filtration; in the case of urine none of it need be added. The yellowish orange colour exhibited by serum when viewed in thin layers, becomes distinctly red when seen in a long column like that in the tube of the albuminimeter. In

general, however, this colouration is not intense enough to do any harm; it simply obviates the need of using the red glass, for, like the latter, it only permits the passage of red rays.

In a series of fifty experiments upon blood serum, Becquerel found that the deviation of the plane of polarisation varied between 4° 30′ and 9°, or, on the average, 7° 30′. In general, the deviation oscillated between 7° and 8°. The corresponding quantities of pure dry albumen were from 4·86 to 9·44 per cent. From these and like observations, it has been calculated that, with a column of liquid 20 c.m. long, each minute of deviation corresponds to 0·18 grm. of albumen. (Becquerel, in Robin and Verdeil's "Chimie Anatomique," 1853, iii., 316).

Principle IV.—Specific Gravity.

Applications.—Estimation of albumen in urine.

Method.—Take the specific gravity of the urine and note the temperature of the liquid when the observation is made. Acidulate a quantity of the urine with acetic acid, place the liquid in a flask provided with a perforated cork carrying a vertical glass tube, and boil it until all the albumen has separated in the insoluble state. Cool the boiled urine to the temperature at which the specific gravity of the original urine was determined, and take the specific gravity of the clear filtrate. Multiply the difference between the two specific gravities by 210, in order to obtain the percentage of albumen in the sample. In a series of thirteen experiments, the least error was 0·005, and the greatest 0·056. (Lang and Haebler, "Zeitsch. analyt. Chem.," 1868, vii., pp. 513, 514).

On A New Test for Albumen, *by* Dr. C. Meymott Tidy.

Of all re-agents that have from time to time been recommended for the coagulation and precipitation of albumen, there is none that I know of where the action is so complete as with carbolic acid. I have suggested as a very useful test solution for the detection of minute quantities of albumen, a mixture of glacial acetic and glacial carbolic acids—generally about equal parts of each is the best proportion, but care must be taken that the acetic acid is not in such excess as to dissolve the albumen immediately it is precipitated. A better plan, although a little more troublesome, is to add about eight or ten drops of alcohol to, say two drams of urine in a test tube, shaking it *very gently*, so as to avoid the frothing of the liquid, and then adding from a pipette about five drops of carbolic acid to the mixture. In this way, 1 part of albumen in 15,000 of water is easily discoverable, the test being, I consider, infinitely more delicate than nitric acid. The precipitate thus produced I have proved by a series of careful experiments to be carbolate of albumen.

I had hoped in this note to have suggested a method of calculating the amount of albumen present in the urine, but in this I

have been a little disappointed. I would just point out, however, that an albuminous urine froths when shaken, but that this frothing ceases as soon as sufficient carbolic acid has been added to precipitate the whole of the albumen. I have been trying, therefore, the addition of known quantities of a carbolic acid solution of standard strength from a graduated pipette to a given quantity of the urine, until the frothing ceases, and thus estimating the amount of albumen by the amount of standard acid that it was necessary to add for this purpose. In this, as yet, I have only been partially successful, but I still hope to perfect this method in time, so as to obtain a ready means of estimating the albumen quantitatively.

Etiology.

Report by John C. Fish, M.D., *Cantab.*, M.R.C.P., *London, Physician to the Royal Hospital for Diseases of the Chest.*

Dr. George Johnson* observes that the causes of hoarseness and aphonia all resolve themselves into some condition which prevents or impedes the free vibration of the vocal cords. He says that there are five chief modes in which such vibration may be interfered with.

1. A tumour upon one or both vocal cords, or between them, may prevent their close apposition.

2. A tumour or swelling above the cords may press upon them and damp their vibrations.

3. Inaction of the laryngeal muscles and a consequent want of due tension and approximation of the cords.

4. The arytenoid cartilages may be destroyed.

5. The cause may be a scanty and feeble respiratory stream of air.

Dr. Wilkes,† during the late prevalence of scarlatina and the succeeding nephritis, met with several cases in which the patients were seized with sudden and violent palpitation of the heart, which subsided within a few days without leaving any trace of an inflammatory process, but which he considered to be due to the presence of urea in the blood.

Dr. Clapton‡ states that the following are the effects of copper slowly introduced into the system:—Symptoms of gastro-enteritis; a green line on margins of the gums and for some little distance

* "Medical Times and Gazette," January 15th, 1870.

† "Clinical Society's Transactions," 1869, 1870. ‡ Ibid.

on the teeth; in some cases a bluish-green tinge of the perspiration and a greenish tinge of the hair; and that though no definite disease has been observed to result from its constant introduction into the system, yet those exposed to its influence complained of habitual lassitude, giddiness, etc., some being very thin and having exceedingly unhealthy complexions. It is a remarkable fact that men working in copper enjoyed complete immunity from cholera or even choleraic diarrhœa during their epidemic visitations. On the other hand, the workmen do not suffer in any marked degree from constipation. Diuresis is not unfrequent, and the teeth are lost at an early age. With regard to the line on the teeth and the colour of the hair it is probable that these are due to the lodgment of minute particles on the external surface; and from the investigations of the Committee appointed for the purpose, it appears that no evidence of any elimination of copper from the blood itself could be detected.

Mr. A. B. R. Myers* in his Essay on "Diseases of the Heart among Soldiers" remarks that disease of the mitral valve is more common in the civil population than disease of the aortic valves, but that the contrary holds good in the army; he considers, therefore, that there must be something specially associated with the life of the soldier to produce this marked difference. He thinks that, although the service in India and other hot and malarious countries may not produce a greater ratio of heart disease than in the healthier climate of Great Britain, it is probable that such is their tendency, as well as more rapidly to develop disease the foundation of which has been laid before the soldier leaves this country. He observes that there is one special cause of heart disease in our army, viz., the prejudicial constriction of the uniform and accoutrements, this producing such obstruction to the circulation that, either directly or indirectly, the heart is abnormally strained and frequently passes into a state of functional derangement, and ultimately of organic disease. Mr. Myers remarks that in civil life, when any prolonged or violent exertion of the body is to be made, the great point first attended to is to remove all the various constrictions of ordinary dress, it being well known how necessary it is under such circumstances to allow the chest its fullest powers of expansion, and consequently the greatest possible freedom to the heart and lungs. In the army, however, he says the contrary custom prevails, the soldier's tunic being made to fit as tightly as possible, the chest being constricted by the waist-belt

* Essay on "Diseases of the Heart among Soldiers," A. B. R. Myers, Assistant Surgeon Coldstream Guards.

below, and the neck by the tunic collar, with or without the stock, above; and to these must be added the pressure caused by the knapsack straps and the pouch-belt. The result of this condition of things is that the chest is, as it were, fixed in a vice, and has consequently little or no power of expansion, and that the circulation through the heart, lungs, and great vessels is proportionately impeded.

Dr. Thorne* draws the following conclusions as resulting from his investigations of the effects produced on the human subject by consumption of milk from cows having Foot-and-Mouth Disease:—

1. That a disease appears sometimes to have been produced in the human subject when the milk of cows suffering from the disease has been freely used without having been previously boiled. That there is no evidence whether this affection is of a specific nature or not; but it seems to consist in a derangement of the alimentary canal accompanied by febrile disturbances, the presence of vesicles on mucous membrane of the mouth and tongue, which, having ruptured, leave superficial ulceration, and at times an herpetic eruption about the exterior of the lips.

2. That in a very large number of cases the milk of cows undoubtedly affected has been used without producing any noticeable morbid effects. This absence of result may, though only to an inconsiderable extent, have been due to the smallness of consumption and the previous boiling of the milk.

3. That, though undoubtedly animals in large numbers are killed at the height of the disease, and their flesh sold as first-class meat, yet in no instance has any disease in the human subject been attributed to the use of such flesh.

Dr. Sanderson† states, with regard to contagion, that the fundamental inference is that every kind of contagium consists of particles which he proposes to call microzymes; that these microzymes are probably spheroidal, transparent, of gelatinous consistence, of density nearly equal to that of the animal liquids in which they float, and that they are mainly, but perhaps not exclusively, composed of albuminous matter; that they are organised beings, and their powers of producing disease are due to their organic development.

With regard to the origin of these microzymes he states that there are two theories, viz.:—

1st. That they exist as particles of living tissue, and thus take

* Twelfth Report of the Medical Officer of the Privy Council, 1869. Appendix.
† Ibid.

part, not only in morbid processes, but in the performance of the normal functions.

Or, 2nd. They are originally morbid, and are imported into the body from without, being derived either from the tissues or organs of other infected individuals, or produced by the transformation of the contents of the reproductive cells of the parasitic fungi inhabiting the higher plants.

Before, however, either of these theories can be accepted, Dr. Sanderson considers that some, at least, of the following questions must be investigated:—

1. Is it true that the destructive parasites which inhabit the tissues of many of our common plants produce microzymes by a normal process of development?

2. Are such microzymes respectively endowed with distinctive morbific properties?

3. Is it true that microzymes take part in any of the normal chemical functions, especially those which relate to the transformation of the albuminous compounds?

4. Can they arise *de novo* in the living tissues as a mere consequence of impaired activity of nutrition.

Dr. Church* states that intracranial aneurysm in the young is commonest in the middle cerebral arteries and their branches, the vessels which are most frequently the seat of plugging from embolic masses.

He observes that it is difficult to offer a satisfactory explanation of the manner in which aneurysm takes place as a sequence of embolism; but he thinks it probable that aneurysmal dilatation takes place when the blood-stream through the artery is obstructed, but not completely arrested, the dilatation consequent on the partial obstruction causing interference in the nutrition of the contiguous parts, as well as of the walls of the artery itself. The weakened arterial wall yields at the spot where it is least supported by the surrounding tissues, and gradually an aneurysm is formed.

Dr. Dickinson† has found certain peculiar morbid changes in the cerebro-spinal system, and associated with diabetes; these consist briefly, in the first place, of a dilatation in the blood-vessels, particularly of the arteries, with accumulation and frequent extravasation of their contents. Next, degeneration of the nervous matter

* "St. Bartholomew's Hospital Reports," vol. vi.

† "Medico-Chirurgical Transactions," vol. liii.

at certain points outside the swollen vessels, these degenerative processes occasioning destruction and excavation of the tissue round the vessels; finally, the contents of cavities so produced appeared to become absorbed, so that simple vacuities were left. The regions affected with the greatest frequency were the olivary bodies, the vicinity of the median plane of the medulla, the grey matter of the floor of the fourth ventricle, and a depression penetrating from between the anterior crura towards the centre of the pons varolii.

Dr. Dickinson observes that, as no organic alteration has been found elsewhere to which the saccharine state of the urine can be attributed, that as the changes in the brain are in their nature such as physiology has shown to be capable of producing that symptom, and that, lastly, as alterations, similar in kind, though differing in distribution, occur as belonging exclusively to the nervous system, quite independently of diabetes, and more particularly in the general paralysis of the insane, these considerations render it likely that the nervous changes are primary.

The Commissioners appointed to enquire into the best means of preventing the pollution of rivers make the following observations:—

If the water is merely used as power, it passes over the mill-wheel without receiving any injury; if, however, it is taken up, because it is pure and clean, by dyers and paper-makers, or others, it issues at the tail of the works polluted in a variety of ways. Sometimes, as in the case of alkali works, hydrochloric acid passes into the stream, where it meets with the drainage from soda waste, thus forming a most noxious and offensive liquid, destructive to vegetable life. In many cases arsenic gets mixed with the water. When the river passes through towns, sewage of all kinds passes into it, and the manufacturers themselves, although complaining of such sewage as most injurious and offensive, very generally pass the excrements of their workmen into the stream without any hesitation.

River pollutions are classed by the Commissioners under two heads: *Sewage* and *Manufacturing Refuse*. Under the former are comprised human excrement and urine, slops which contain animal, vegetable, and other refuse, water from wash-houses, containing soap and the animal matters from soiled linen, the drainage from cow and slaughter-houses.

Under Manufacturing Refuse are classified the following:—

(1.) Pollution by dye, print, and bleach works.

(2.) ,, chemical works.

(3.) Pollution by tanneries.
(4.) ,, paper-making.
(5.) ,, woollen works.
(6.) ,, silk works.

Animal organic matter, as it occurs in sewage, is that kind of pollution which renders waters not only most offensive to the senses, but most likely to injure health, both by its gaseous emanations, and by its deleterious effects when used as a beverage. Pollution by vegetable organic matter is caused by dye and print works, and ranks next in offensiveness to pollution by animal organic matter. Chemical works contribute chiefly mineral impurities, which communicate to water extreme hardness, and other disagreeable and even poisonous properties. With regard to the alleged self-purification of polluted rivers, the Commissioners make the following remarks:—

"Whether we examine the organic pollution of a river at different points of its flow, or the rate of disappearance of the organic matter of sewage when the latter is mixed with fresh water and violently agitated in contact with air, or, finally, the rate at which dissolved oxygen disappears in water polluted with 5 per cent. of sewage, we are led in each case to the inevitable conclusion that the oxidation of the organic matter in sewage proceeds with extreme slowness, even when the sewage is mixed with a large volume of unpolluted water, and that it is impossible to say how far such water must flow before the sewage matter becomes thoroughly oxidised. It will be safe to infer, however, from the results obtained, that there is no river in the United Kingdom long enough to effect the destruction of sewage by oxidation."

The result of the enquiries of the Commissioners into the influence of river pollution on health has, it is to be regretted, not confirmed their anticipations; for, although it needed no enquiry to enable them to say with confidence that the river is a source of great discomfort, they find it impossible, from the evidence before them, to assert that the filthy river is also the occasion of disease. This is partly owing to the incompleteness of the health-statistics laid before them; partly, also, to many other causes affecting health which entirely dominate, and if any mischievous influence from a polluted river should exist, effectually conceal it—*e.g.*, the excessive density of the population in some localities, the constant employment of the mothers of young families in mills, and the general adoption of the privy system, inevitably unwholesome in the midst of a densely populated town.

Dr. George Johnson* thinks that he has discovered a new source

* "British Medical Journal," Sept. 24, 1870.

whence lead may be introduced into the system with its usual poisonous results, in the material technically called "over-land cloth," used by portmanteau makers, the handling of which, and probably the fumes arising from its combustion, induced the symptoms in a very interesting case narrated by him.

Hygiene.

Introduction.—*By* Charles A. Cameron, Ph. D., M.D., etc., etc.; *Professor of Hygiene and Political Medicine in the Royal College of Surgeons in Ireland; Professor of Chemistry in Steeven's Hospital Medical College, etc., etc.*

The reports of Dr. Farquharson and Dr. Ireland which follow this introduction embody a large and varied amount of valuable information upon almost every subject usually included under the comprehensive title of hygiene. My colleagues, indeed, have so completely exhausted this department that, writing later than they, I find but little occupation for my pen. However, since the reports of Drs. Ireland and Farquharson were completed, several works and papers on topics more or less connected with hygiene have appeared, and to some of these only I purpose referring in the following observations:—

Vaccination.—Mr. George S. Gibbs has published another startling pamphlet, which purports to be a translation of a "Report presented to His Excellency the Minister for Agriculture, Commerce, and Public Works, by the Imperial Academy of Medicine, respecting the vaccination performed in France during the year 1869." It is published by Longmans, Green, Reader, and Dyer, of London, and is dated 1870. In this pamphlet Mr. Gibbs gives a statistical table showing the number of vaccinations and re-vaccinations, the cases of small-pox and deaths therefrom and the number of births in each of the departments of France. We have not space at our disposal to reproduce these tables, but the table, page 294, gives a summary of the averages in certain groups of the departments.

From the following and other tables of statistics Mr. Gibbs deduces certain conclusions, or "readings," as he terms them, which at first glance certainly would appear to indicate that in France the results of vaccination had been anything but beneficial.

Number of Departments in France.	Per centage of Vaccinations and Re-Vaccinations to Births.	Per centage of Small-pox cases to Births.	Per centage of Small-pox Deaths to Births.	Per centage of Small-pox Deaths to Small-pox Cases.
SEVENTY-SEVEN,—all for which the Reports are complete,—extremes	16 to 133	0.0 to 15.14	0.0 to 1.69	0.0 to 2.5
Average	65	2.08	0.22	10.1
TEN, — in which Vaccination is *least* practised, — extremes	16 to 26	0.0 to 4.4	0.00 to 0.42	0.0 to 21.2
Average	24	0.88	0.01	9.7
TEN, — in which Vaccination is *most* practised, — extremes	93 to 133	0.0 to 14.2	0.0 to 1.59	0.0 to 20.0
Average	105	4.27	0.49	11.6
23 in which the proportion of Vaccinations to Births does not exceed 50 per cent.,—extremes	16 to 50	0.0 to 4.4	0.00 to 0.42	0.00 to 37.5
Average	34	0.83	0.08	9.2
54 in which the proportion of Vaccinations to Births is more than 50 per cent.,—extremes	51 to 133	0.0 to 15.14	0.10 to 1.69	0.0 to 72.5
Average	77	2.54	0.28	10.6

SUMMARY OF AVERAGES.

	Ten Departments.		Departments.	
	Least Vaccinated.	Most Vaccinated.	23 Least Vaccinated.	54 Most Vaccinated.
Small-pox cases to Births	0.88	4.27	0.83	2.54
Small-pox Deaths to Births	0.01	0.49	0.08	0.28
Small-pox Deaths to Cases	9.7	11.6	9.2	10.6

"In the summary of averages, the figures for the two sets of ten departments and for the two portions of the whole country are brought into juxtaposition, to facilitate comparison. The reading is:—for every eighty-eight cases of small-pox occurring in the ten departments least vaccinated, there occurred 427 in the ten most vaccinated; for every eighty-three cases occurring in the twenty-three departments least vaccinated, there occurred 254 in the fifty-four most vaccinated. Small-pox deaths:—for every one occurring in the ten departments least vaccinated, there occurred forty-nine in the ten most vaccinated; for every eight occurring in the twenty-three departments least vaccinated, there occurred twenty-eight in the fifty-four most vaccinated. Proportion of small-pox deaths to small-pox cases:—out of every thousand cases occurring in the ten departments least vaccinated, there died 97; out of every thousand cases occurring in the ten most vaccinated, there died 116; out of every thousand cases occurring in the twenty-three departments least vaccinated, there died 92; out of every thousand cases occurring in the fifty-four departments most vaccinated, there died 106."

In reading these statistics, we notice that no information is given relative to the former sanitary condition of the departments where vaccination is most or least practised. It should have been shown whether or no small-pox had increased or decreased within the last ten years in both classes of departments. Perhaps in a department where, in 1867, there were high proportions of vaccinations and small-pox cases to births, there were in 1857 a lower proportion of vaccinations, and a higher ratio of small pox attacks.

In order to establish the proposition that the number of small-pox cases stood in a direct relation to the number of vaccinations, it should be shown that such a condition of things prevailed generally throughout all the departments of France. We find, however, that in several of the "most vaccinated" departments there were few or no cases of small-pox; while, on the other hand, in several of the "least vaccinated" departments there were large proportions of small-pox attacks to births. In order to show how fallacious it would be to deduce from the statistics in this pamphlet any conclusions adverse to the practice of vaccination, we submit the following "readings" of Mr. Gibbs' figures.

In the ten departments, where Mr. Gibbs says there were the fewest vaccinations and the fewest cases of small-pox, the following figures apply:—

Departments.	Per centage of Vaccinations and Re-Vaccinations to Births.	Per centage of Small-pox cases to Births.	Per centage of Small-pox Deaths to Births.
Creuze	16	0·10	0·00
Corse	17	0·91	0·18
Ardennes	20	0·00	0·00
Aveyron	19	0·35	0·02
Cher	21	0·00	0·00
Alpes, Maritimes	25	1·97	0·42
Loiret	25	0·37	0·02
Ariège	28	0·93	0·14
Hérault	28	1·41	0·18
Manche	28	0·00	0·00
Average	22·7	0·404	0·096

The total number of births amounted to only 77,856.

Let us now compare with these figures the statistics of ten of the departments where vaccinations were most practised:—

Departments.	Per centage of Vaccinations and Re-Vaccinations to Births.	Per centage of Small-pox cases to Births.	Per centage of Small-pox Deaths to Births.
Charente Inferieure	93	0·52	0·05
Pas de Calais	82	0·23	0·00
Vosges	84	0·27	0·05
Vendée	96	0·00	0·00
Corrièze	110	0·06	0·01
Seine et Oise	95	0·28	0·02
Lot et Garonne	94	0·29	0·05
Pyrenees, Bassos	85	0·00	0·00
Aube	85	0·29	0.02
Seine et Marne	103	0·08	0·00
Average	92·7	0·202	0·015

The total number of births amounted to 94,395.

The large number of small-pox cases in the ten departments which Mr. Gibbs describes as "most vaccinated," include six in which there were few or no cases. The prevalence of small-pox in the ten departments was, in fact, owing to epidemics of the disease

which occurred in four of them. No information is afforded relative to the immunity from small-pox of the vaccinated, as compared with the unvaccinated. On the whole, we are satisfied that there is nothing in Mr. Gibbs' pamphlet which should lead us to modify the opinion generally entertained relative to the value of vaccination as a prophylactic agent.

In his current report, Dr. Simon makes some most interesting observations relative to the alleged introduction of syphilitic poison, together with vaccinal matter, into the bodies of infants. He believes that in a few cases on the Continent children were inoculated with syphilitic virus by vaccination; but he endeavours, and in my humble judgment successfully, to prove that these were cases of *mala praxis*, and the acts of slovenly or grossly careless manipulators.

That with the vaccine matter the poison of syphilis is often associated is a conclusion wholly unwarranted; in fact, such an assumption is negatived by the experience of the whole body of British vaccinators. On this subject, Dr. Simon's opinions coincide with those of the great experimentalists, Schrier, of Ratisbon; Heim, of Wurtemburg; and Boeck, of Christiana, who have investigated the point in a most exhaustive manner.

Ozone in Relation to Disease.—Dr. Ross, Medical Officer of Health for the district of St. Giles, London, in his report upon the recent outbreak of the relapsing fever in that part of the Metropolis, has made some interesting observations relative to ozone. He found that as the amount of ozone in the atmosphere decreased, the mortality from the disease increased. When the mean amount of ozone was so low as 0·4 (at Greenwich), the mortality amounted to 3·4 each day; when the ozone rose to 1, the cases of disease sank to 3; a further increase of ozone to 3 appeared to reduce the attacks to 0·9 *per diem*. Finally, when the ozone stood at 5, there were daily but 0·3 cases of the fever. If these two sets of facts be but mere coincidences it is certainly most surprising. Dr. Ross infers from the apparent influence of atmospheric ozone in arresting the spread of relapsing fever, that the poison of the disease is probably a weak one, and of vegetable origin. The germs of the malady, floating about in the atmosphere, would be more readily ozidised and rendered innocuous when there was abundance of ozone present, for the oxidising effects of ozone are very remarkable.

Is the Flesh of Diseased Meat unwholesome Food?—In a paper which I read before the Medical Society of the King's and Queen's

College of Physicians, on the 14th December, 1870, I detailed the particulars of a large number of cases of severe choleraic diarrhœa, produced by the use of diseased meat, which had come under my observation. In the discussion which followed the reading of this paper, Sir Dominic J. Corrigan stated that some years ago all the felidæ at the Dublin Zoological Garden were fed with beef. From motives of economy, horse-flesh was subsequently employed, and after a short time all the animals fed upon it died from glanders. It was then discovered that horses suffering from glanders occasionally supplied the carrion upon which the felidæ had been fed. These animals are still fed upon horse-flesh, but precautions are taken for the purpose of securing it free from disease.

In Dublin there was no proper inspection of meat until about four years ago, when a very effective system was organised. Four police constables and a clerk of the markets (appointed Inspectors of Nuisances under the Sanitary Act of 1866) are occupied in inspecting the slaughter houses, butchers' stalls, and markets, and any article which they believe to be unsound is seized upon and detained until properly inspected. Eight sanitary sergeants of police give some assistance in this work; and there is a general instruction to the whole police force (numbering about 1,100 men) to seize any animal or meat that appears to be unsound, and to aid by every means in their power the special sanitary policemen. From the 1st of January, 1870, to the present 17th December, 540 carcasses of oxen, sheep, and pigs, besides large quantities of fragments of meat and of fish, vegetables, and fruit have been seized and confiscated. I calculate that the quantity of animal food condemned in 1870 will amount to little short of half-a-million pounds weight. Several vendors of diseased meat have been imprisoned for periods varying from one to three months, and many others have been fined from £1 to £20.

The disease which is most prevalent amongst the oxen in Ireland is contagious pleuro-pneumonia. It is endemic amongst the dairy herds, annually carrying off from 8 to 12 per cent. of these animals. A disease, termed the "soldier," which resembles scarlatina, is often very fatal amongst swine. Under its influence the flesh acquires a pink hue. Two cases of trichinosis in the human subject, came under my notice in Dublin; but I have never found the trichina spiralis in fresh pigs, though I have constantly sought for its presence. To compensate for the absence of trichinæ, cysticerci are very numerous amongst fresh swine. Measly bacon is always condemned by me when seized by the police.

Qualities of Milk from Diseased Cows.—In the current number of Dr. Simon's Annual Report, Dr. Thorne describes the results of his enquiries relative to the effects produced by the use of the milk of cows affected with foot-and-mouth disease. He states that although there is evidence to prove that such milk is commonly consumed without any bad results apparently following, yet several cases of apthous ulcerations in the mouth have been clearly traced to the use of this article. One undoubted case came under my own observation.

It has recently been shown that milk adulterated with impure water has been the means of spreading typhoid fever.

Poisonous Confectionary.—There is a general opinion that poisonous pigments are now very seldom used for the purpose of colouring confectionary. I have recently examined the coloured sugar confectionary, manufactured by twelve of the largest wholesale manufacturers in Dublin. In nine cases all the yellow articles owed their hue to chromate of lead. With one exception all the red articles were coloured with cochineal, the exception being vermillion, which constituted four grains per ounce of a cheap sugarstick. Vermillion is a very inert substance, but it is often adulterated with red lead, which poison is active enough in the case of young children. Except flour and gum (which can hardly be regarded as adulteration), the lozenges only in one instance contained terra alba, a species of porcelain or pipe clay.

The manufacturers of the confection coloured with lead and mercury compounds, have this month (December) been convicted before the magistrates under the Adulteration of Food Prevention Act.

Doctrine of Contagion.—Tyndall's remarkable lecture on atmospheric dust gave a degree of popularity to that subject which all the labours of previous investigators had failed to secure for it. Huxley's eloquent and learned address, at the late meeting of the British Medical Association, has in a similar manner directed the attention of the reading public to what we may term the doctrine of contagion. The whole address is worthy of a careful study, as it is replete with valuable suggestions; but it is in relation to the subject of the germs of disease that his address will prove most interesting and instructive to medical men. This eminent philosopher believes that the poison of the zymotics is composed of small living bodies, which may be termed *microzymes*. Speaking of vaccination, he says:—

"A minute cut is made in the skin, and an infinitesimal quantity of vaccine matter is inserted into the wound. Within a certain time a vesicle appears in the place of the wound, and the fluid which distends this vesicle is vaccine matter, in quantity a hundred or a thousandfold that which was originally inserted. Now what has taken place in the course of this operation? Has the vaccine matter, by its irritative property, produced a mere blister, the fluid of which has the same irritative property? Or does the vaccine matter contain living particles, which have grown and multiplied where they have been planted? The observations of M. Chauveau, extended and confirmed by Dr. Sanderson himself, appear to leave no doubt upon this head. Experiments, similar in principle to those of Helmholtz on fermentation and putrefraction, have proved that the active element in the vaccine lymph is non-diffusable, and consists of minute particles not exceeding 1-20,000th of an inch in diameter, which are made visible in the lymph by the microscope. Similar experiments have proved that two of the most destructive of epizöotic diseases, sheep-pox and glanders, are almost dependent for their existence and their propagation upon extremely small living solid particles, to which the title of *microzymes* is applied. An animal suffering under either of these terrible diseases is a source of infection and contagion to others, for precisely the same reason as a tub of fermenting beer is capable of propagating its fermentation by 'infection' or 'contagion' to fresh wort. In both cases it is the solid living particles which are efficient; the liquid in which they float, and at the expense of which they live, being altogether passive.

"Now arises the question—are these microzymes the results of *Homogenesis*, or of *Xenogenesis*? are they capable, like the *Torulæ* of yeast, of arising only by the development of pre-existing germs? or may they be, like the constituents of a nut-gall, the results of a modification and individualisation of the tissues of the body in which they are found, resulting from the operation of certain conditions? Are they parasites in the zoological sense, or are they merely what Virchow has called 'heterologous growths?' It is obvious that this question has the most profound importance, whether we look at it from a practical or from a theoretical point of view. A parasite may be stamped out by destroying its germ, but a pathological product can only be annihilated by removing the conditions which give rise to it.

"It appears to me that this great problem will have to be solved for each zymotic disease separately, for analogy cuts two ways. I have dwelt upon the analogy of pathological modification, which is in favour of the xenogenetic origin of microzymes; but I must now speak of the equally strong analogies in favour of the origin of such pestiferous particles by the ordinary process of the generation of like from like.

"It is, at present, a well-established fact, that certain diseases, both of plants and of animals, which have all the characters of contagious and infectious epidemics, are caused by minute organisms. The smut of wheat is a well-known instance of such a disease, and it cannot be doubted that the grape disease and the

potato disease fall under the same category. Among animals, insects are wonderfully liable to the ravages of contagious and infectious diseases caused by microscopic *fungi*."

After describing various diseases in the lower animals, which are undoubtedly produced by the presence of the very lowest forms of living things, Professor Huxley concludes as follows:—

"It is now certain that this devastating, cholera-like, Pébrine, is the effect of the growth and multiplication of the *panhistophyton* in the silkworm. It is contagious and infectious because the corpuscles of the *panhistophyton* pass away from the bodies of the diseased caterpillars, directly or indirectly, to the alimentary canal of healthy silkworms in their neighbourhood; it is hereditary, because the corpuscles enter into the eggs while they are being formed, and consequently are carried within them when they are laid; and for this reason, also, it presents the very singular peculiarity of being inherited only on the mother's side. There is not a single one of all the apparently capricious and unaccountable phenomena presented by the Pébrine, but has received its explanation from the fact that the disease is the result of the presence of a microscopic organism, *panhistophyton*.

"Such being the facts with respect to the Pébrine, what are the indications as to the method of preventing it? It is obvious that this depends upon the way in which the *Panhistophyton* is generated. If it may be generated by Abiogenesis, or by Zenogenesis, within the silk-worm or its moth, the extirpation of the disease must depend upon the prevention of the occurrence of the conditions under which this generation takes place. But if, on the other hand, the *Panhistophyton* is an independent organism, which is no more generated by the silkworm than the mistletoe is generated by the oak or the apple-tree, on which it grows, though it may need the silkworm for its development in the same way as the mistletoe needs the tree, then the indications are totally different. The sole thing to be done is to get rid of, and keep away the germs of, the *Panhistophyton*. As might be imagined, from the course of his previous investigations, M. Pasteur was led to believe that the latter was the right theory; and guided by that theory, he has devised a method of extirpating the disease, which has proved to be completely successful wherever it has been properly carried out.

"There can be no reason, then, for doubting that, among insects, contagious and infectious diseases, of great malignity, are caused by minute organisms which are produced from pre-existing germs, or by Homogenesis; and there is no reason, that I know of, for believing that what happens in insects may not take place in the highest animals. Indeed, there is already strong evidence that some diseases of an extremely malignant and fatal character to which man is subject, are as much the work of minute organisms as is the Pébrine. I refer for this evidence to the very striking facts adduced by Professor Lister in his various well-known pub-

lications on the antiseptic method of treatment. It seems to me impossible to rise from the perusal of those publications without a strong conviction that the lamentable mortality which so frequently dogs the footsteps of the most skilful operator, and those deadly consequences of wounds and injuries which seem to haunt the very walls of great hospitals, and are, even now, destroying more men than die of bullet, or bayonet, are due to the importation of minute organisms into the wounds, and their increase and multiplication; and that the surgeon who saves most lives will be he who best works out the practical consequences of the hypothesis of Redi."

In the current volume of the Annual Report of the Medical Officer of the Privy Council we find an "Introductory Report on the Intimate Pathology of Contagion," by Dr. Burdon Sanderson. The reporter gives a clear description of the labours of the mycologists—chiefly the German—who have been endeavouring to prove that zymotics and epizöotics are produced by low forms of vegetable life. Dr. Sanderson believes that these researches have established at least one fundamental doctrine—namely, that every kind of contagion consists of particles. The minutest organisms yet discovered are the spheroidal corpuscles termed *micrococcus*, by Hallier, and *microzymæ* by Béchamp. These minute bodies are probably the poison of all kind of contagious diseases. Their minuteness renders very difficult their accurate examination; but there is no doubt that they do not all possess the same specific properties. All *microzymæ* may not be *contagium*, but all kinds of contagium are in all probability microzymæ. This subject is one of great interest, and is admirably treated in Dr. Sanderson's report.

Hygiene.—Diet, Clothing, Regimen, etc., *Report by* Robert Farquharson, M.D., *Medical Officer to Rugby School.*

The subjects on which I have undertaken to report have not been characterised by much progress during the past year. But if no special improvements have been accomplished, much useful work has been done, and a variety of information accumulated, which I will do my best to chronicle in a concise form. Suggestions of much value have been made by various eminent authorities, and in reviewing the extensive field of literature over which their labours are scattered, I shall endeavour to indicate the direction in which further advances will most probably be made.

Diet

is a subject of great importance. During the last few years most extended and valuable investigations have cleared up many of its

chief difficulties, have enabled us to trace every nutritious particle to its right destination, and so to apportion food to work, as to maintain our bodies in their highest efficiency without waste. We can now sit down in our studies, and draw up with tolerable precision rules of eating and drinking for persons in every condition of life, apportioning the various elements, and balancing one against the other with sufficient accuracy to form one harmonious whole. But although such conclusions have been productive of undoubted good, it must always be remembered that the human body has a vital principle, which withdraws it from the rank of mere chemical compounds, and prevents our treating it purely from the crucible and laboratory point of view. To those who are able to pick and choose, experience and peculiarity of constitution will usually furnish the surest guides in diet, and the truth of this proposition is shown in the large numbers of persons who pass through life free from dyspeptic troubles. That the lower classes so frequently suffer from such derangements is due to the fact that they are often underfed, and that their deficiency of nourishing food encourages an almost irresistible craving for such sedatives and stimulants as tea, tobacco, spirits, etc. On the other hand, the tendency of those in easy circumstances is to eat too much, and could we strike such a balance between the two extremes as to supplement the deficiency of the one by the waste of the other, we might claim to be social reformers on the largest scale. But, after all, may it not fairly be conceded that those of the upper classes who are not actually idle, require a very considerable excess of nourishment;* their nervous systems are more highly organised, their anxieties greater because more keenly felt, and the wear and tear of brain work made doubly destructive by perpetual competition. We may regard the labourer more in the light of a machine, performing his unvarying duties from day to day, without much ambition or intellectual strain, and in his case the loss by friction is more readily made good. Monotonous his diet always is, and scanty in proportion to his wants; but while it supports him in robust health, it would speedily starve those who work rather by their heads than their hands. It is much to be deplored that the want of cooking skill among the poor not only causes great waste, but deprives their food of much of its palatable quality, and Dr. Letheby notices with approval a suggestion for assisting them in this respect. He writes:—†

* Haughton's experiments gave results which appeared to show that brain workers required more food than body workers. (See "Dublin Quarterly Journal of Medicine," for 1860.)

† "On Food," by H. Letheby.

"Mr. Riddle has proposed very recently, in a paper which was read before this society (the Society of Arts), that arrangements might be made for cooking dinners on a large scale, and sending them out to the houses of the poor. He proposes to prepare daily good rations of roasted, baked, and boiled meat, with vegetables, and to send them out in 2 lbs., 4 lbs., and 5 lbs. tin canisters, all ready for immediate use, and kept warm in little compartments of a properly constructed cart."

A great evil of careless or ignorant preparation of food undoubtedly is the want of variety, and the perpetual ration of boiled meat, which too often disgusted our soldiers in former years, was only displaced by the indignant efforts of public opinion. It is, therefore, evident that culinary taste, and frequent change of foods are important elements in the formation of a dietary; and although persons are frequently blamed for concentrating too much attention on their daily meals, there can be no doubt that careful cooking enables many stomachs to digest that which would otherwise be rejected; and instead of reproaching a man for his gourmand propensities, we might in many cases credit him with the study of his nutrition on successfully empirical, if not scientific, principles.

I will now proceed to the more precise divisions of our subject, and touch in the first place on *diet as it affects our public services.*

We have seen that we may with safety trust individuals to select their own food, but when we come to deal with large bodies of men, the responsibility of arranging a duly varied and nutritious dietary becomes extreme. Much has recently been done to amend the rations of our army and navy, and the success attained is proved by the very fair average of health enjoyed by both. Perfection, however, has not yet been reached, and although I cannot refer to any decided examples of improvement during the past year, literature has not been idle, and several suggestive papers have appeared on the subject. First among these I must place one read before the Royal United Service Institution, of London, by Dr. De Chaumont, Assistant Professor of Hygiene, at Netley, in which he brings much experience and scientific training to bear upon the questions under discussion. The lecture being printed for private circulation only, I have to thank the secretary for kindly favouring me with a copy.

After showing the great diminution of mortality in our army during the last few years, Dr. De Chaumont refers to the experiments of recent chemists, in consequence of which it is necessary to modify Liebig's original division of food into the nitrogenous or plastic, and the carboniferous or combustible. We know that a

good deal of the energy of the body is due to the carboniferous * rather than the nitrogenous elements; for if the waste of the muscles were the sole cause of force, an increased elimination of nitrogen would necessarily attend extreme exertion. So far is this from being the case, however, that under such circumstances we find increased elimination of carbonic acid, and vapour of water, and an actual retention of nitrogen to provide for the increase in muscular bulk which usually follows. If the supply of nitrogen be diminished, the active muscles feed on those parts which are less energetically employed, the heart being especially apt to suffer.

As regards the quantity of food, it seems evident that the soldier's ration, as it is now stands, is deficient in various essential respects.

"The albuminates are deficient; the fats are very deficient; the

* Notwithstanding the valuable researches which have recently been made relative to this subject, I believe that it is still veiled in great obscurity. It is, however, very probable that a large proportion of the motive power, evolved within the animal mechanism, is derivable from the disorganisation of the carbo-hydrates and fats of food, or of the tissue into which they are converted. Still we can easily conceive that if the non-nitrogenous elements of food be deficient, whilst the albuminoids are largely in excess, the animal motive power, and the animal heat will be chiefly derived from the latter. If albumen be consumed as food, and its elements pass away from the body in the almost purely mineralised form of urea, there can be no doubt of its contributing to maintain the heat or motion (and probably both) of the body. My own *opinion* is that every kind of food evolves both heat and motive power in the animal body. Savory found that rats could live on a diet from which the so-called fat-producing foods had been utterly excluded. The celebrated experiment of Fick and Wislicenus—the ascent of the Faulhorn, and its results—which has to some extent been the means of directing general attention to this point, appears to be open to criticism. They found that the expenditure of force, necessary to raise their bodies through a certain height, must have been nearly altogether derived from the consumption of the non-nitrogenous constituents of their food or bodies. The quantity of nitrogenous food or tissue used was estimated by the amount of nitrogen found in the urine. Now, E. Smith has shown that the elimination of urea does not increase *during* active exercise, but *after* it; and it does not appear that allowance was made for this fact by Fick and Wislicenus. Again, they estimated the force employed to raise their bodies to the summit of the Faulhorn, as if they had been elevated through perpendicular height instead of raised up an inclined plane. To ascend a mountain at an angle of 45 degrees requires a much greater expenditure of *energy* than would be necessary if it were climbed at an angle of 25 degrees. It is probable that the work performed by Fick and Wislicenus was overestimated by at least one-fourth, and consequently they underestimated the amount of motive power obtained by the consumption of their nitrogenous tissues or food. It is, however, evident from the results of the researches of Voit, Bischoff, Frankland, Haughton, Mayer, and others, that under ordinary circumstances increased exercise causes an increased expenditure rather of the fats and carbo-hydrates than of the albuminoids.—C. A. CAMERON.

starches are somewhat in excess; the salts are rather deficient; the following being the scale :—

Nitrogen . .	266 grains	Equal in potential energy to about 3,640 foot tons.
Carbon . . .	4,718 ,,	
Salts	354 ,,	

"This diet is much below the average of a working man's standard, and we could not demand on it more than a very moderate day's work, say 150 to 200 tons; a fair peace ration ought to include 16 ozs., instead of 12 ozs. of meat, standing thus :—

Nitrogen . . .	303 grains	Equal in potential energy to about 3,838 foot tons.
Carbon . . .	4,948 ,,	
Salts	379 ,,	

" A war dietary ought to provide for a minimum amount of work of 3,500 foot tons, the two points specially requiring attention being as follows :—

" 1. To provide a diet that shall furnish sufficient force for the work required of the soldier; that is, to make the food proportionate to the exercise.

"2. To provide a diet of sufficient variety to prevent the occurrence of scurvy.

" As regards individual details—

" 1. *Nitrogen.*—A pound of meat, including bone, would probably be sufficient, provided that fresh and preserved meat were issued as often as possible, and salted meat as rarely as possible. Beef and mutton should be made to alternate as much as can be managed. The existing deficiency of nitrogen might be supplied by a small portion of cheese, with peas or beans.

" 2. *Fat.*—This has always been deficient, but is of great importance to hard-worked men. Bacon fat, or butter should be used, and the use of oil encouraged.

" 3. *Starch, or Carbo-Hydrates.*—This ingredient might advantageously be diminished, fresh bread being much preferable to biscuit, and potatoes and rice being also convenient forms.

" 4. *Salts.*—In addition to common salt, we might add potassium chloride, but we must trust to fresh vegetables for our principal supply. Almost any mild plants will make salad, and vinegar should always be freely used on a campaign.

" 5. *Condiments* are of great value, especially in the form of mustard and pepper.

" 6. *Beverages.*—The best beverages to work on are tea, coffee, and cocoa, and these should be freely provided, with a good supply of sugar. The spirit ration is a mistake, and might be judiciously superseded by a moderate allowance of good beer or red wine.

" *Tobacco* should be supplied in moderation, as most men are the better for a little of it.

" Liebig's Extractum Carnis has a wonderful recruiting power, and is admirably adapted for keeping up the strength and spirits of men going on trench or picket duty on a cold, wet night, or starting on a toilsome march.

"To sum up then," Dr. de Chaumont says, "I would propose as a war ration some such diet as the following, to be varied as much and as frequently as the ingenuity or opportunity of the commissariat can devise, or the skill of the cook can accomplish."

PROPOSED DAILY RATIONS IN TIME OF WAR.*

	Gross Wght. including Water.	Water.	Albuminates.	Fat.	Carbo-Hydrates.	Salts.	
	oz.	oz.	oz.	oz.	oz.	oz.	
Meat (1 lb. less bone), say	12·8	9·6	1·9	1·1	..	0·2	
Bread	20·0	8·0	1·6	0·3	5·9	0·3	
Potatoes	16·0	11·8	0·2	..	3·7	0·2	
Vegetables (as carrots)	4·0	3·4	..	..	0·3	0.03	
Peas or Beans	3·0	0·4	0·7	0·1	1·6	0·1	
Cheese	2·0	0·7	0·7	0·5	..	0·1	
Bacon-fat, Oil, or Butter	2·0	0·1	..	1·8	..	..	
Sugar	2·0	0·1	..	..	1·9	..	
Salt	0·5	..	..	..	..	0·5	
Vinegar	2·0	1·9	..	..	..	0·1	
Condiments	as required.		..	..	..	..	
Tea	0·5	..	..	..	..	..	
or							
Coffee	2·0	?	0·3	1·0	0·5	..	
or							
Cocoa	2·0	?	0·3	1·0	0·5	..	
Beer	20·0	17·8	..	..	1·2	0·1	and 1 oz. of alcohol
or							
Wine (red)	10·0	8·9	..	..	..	0.1	Ditto.
Totals	86·3 to 74·8	53·8 to 44·9	5·7 to 5.4	4·8 to 3·8	15·2 to 14·0	1·8	1

* Would not the great variety of articles here named be found rather unmanageable in time of war? If the animal food could, at least in actual battle-time, be issued in a concentrated form, it would be the means of preventing many a soldier from suffering from a long fast after a hard fight. Potatoes are a bulky food to transport. Soldiers marching to meet the enemy should be supplied with such articles as meat biscuits, essence of meat, preserved meats, hard biscuits, chocolate cakes—anything in short, which would contain the largest amount of aliment, sufficiently varied, in the smallest possible compass.—C.A.C.

This would give of nitrogen, carbon, and salts, about—

Nitrogen	375 to 396 grains	Equal in potential energy to from about 4,800 to 5,300 foot tons.
Carbon*	5,300 to 5,930 ,,	
Salts	780 ,,	

From this it will be seen, that in common with other army medical officers, Dr. De Chaumont is decidedly of opinion that the present diet scale is deficient in sustaining power, and that it ought to be increased from ¾ to 1 lb. of meat per diem. The importance of this alteration has been repeatedly pressed upon the authorities, and has obtained the sanction of the Director-General; but, doubtless from motives of economy, its adoption has not yet been conceded. But in the event of its being determined thus to augment the soldier's bill of fare, I would earnestly recommend the extra portion of food to be added to the evening meal, the present portion of meat, with bread and potatoes, being amply sufficient for dinner alone. The radical defect of the present system is, that after his mid-day meal at 12.30 he has no solid food; the modicum of bread and coffee, issued at 4.30, being barely sufficient temporarily to check the rising appetite. After this, if not on any duty, he leaves barracks, and spends his evening too often in dissipation and excess. As a natural consequence of this, his frame, lowered by a prolonged fast, is especially liable to contract infectious disease, and to develop all the worst effects of alcoholic liquors. Strong drink, adulterated as it not unfrequently is, exercises a maddening influence on an empty stomach, and no one can have seen anything of army practice without meeting numberless instances of this. Soldiers are subject to a species of extremely violent epileptiform fit, solely as the result of comparatively limited excess; and it is not too much to believe that the remoter influences of such practices are in part the cause of the premature decay so universally noted among them.

Now, could it be arranged that something of more nourishing quality, such as cheese and butter, could be added to the evening meal, the soldier would not only be better able to resist the temptations by which he is surrounded, but would escape some of their worst perils if he yields; for it is most frequently while under the influence of drink that he contracts venereal disease. Now that canteens are purely under regimental control, some plan of this sort might readily be effected; and if at the same time more comforts were introduced into barracks, they might successfully compete with the attractions to be met with outside. Snugly fur-

* Not including the alcohol.

nished rooms, where he can enjoy his pipe and glass of beer cheaply and wholesomely, might eventually wean him from the public-house, and induce him to save some portion of his scanty pay. The establishment of institutes outside barracks seems to me a mistake, in so far as they acknowledge the principle that all amusement and relaxation must necessarily come from without, whereas the fitting up of our canteens as sort of clubs, where the soldier on moderate terms can spend his leisure time, and see his friends, will supply more of the home feeling. But the great point is to feed him better. Too often drink is taken to satisfy the cravings of hunger; and although it may be urged that he may purchase extra food, it is hardly to be expected that he will thus habitually employ his few spare coppers. Good food means good work. The soldier now ages fast and breaks down early, and surely in such a case prevention is better than futile attempts at cure. On these points we find some sensible remarks by Surgeon-Major Logie,* of the Royal Horse Guards, who attributes much of the premature decay of the cavalry soldier to the fact of his having to do hard stable duty before breakfast.

In the case of our *Naval Service*, greater attention to detail is undoubtedly necessary to ensure abundant food, and supply that freshness and variety requisite for the maintenance of health. It must be remembered that sailors have to contend not only against scurvy and a monotonous life, but against the exhausting effects of severe muscular exertion, and that defects in their dietary cannot readily be supplied from their own private resources. Want of variety has usually been the chief error committed, and it is no doubt a matter of some difficulty to ring the changes on a diet scale composed in great measure of salt meat. On these and other points we meet with some able remarks by Dr. Rattray, R.N.,† in the appendix to the "Statistical Report of the Navy for 1867," a copy of which has been kindly furnished me by the Director-General.

After giving a general sketch of the dietary of seamen, the injurious effects of a too exclusively salt ration, and the causes of scurvy, Dr. Rattray proceeds to unfold his views of how sailors ought to be fed. While acknowledging that the naval is perhaps the most perfect system yet introduced, he considers that it errs on the side of want of elasticity and power of adapting itself to varieties of climate and temperature.

* "Lancet," Sept. 18th, 1867.

† "Statistical Report of the Health of the Navy for the year 1867." Published September, 1867.

The three great mistakes to be avoided are—

1. The excessive use of salt meat, which ought to be in great measure superseded by that preserved in tins, and which ought to be given every second, instead of every third day, as under present regulations.

2. Giving the same constituents of food in warm as in cold regions, instead of endeavouring to reduce the nitrogenous in favour of the more vegetable and less stimulating elements.

3. The spirit ration is not only unnecessary to comfort, but injurious to health, especially in the tropics, and might be replaced by coffee or lime-juice.

Greater variety ought to be carefully studied, and the use of fresh vegetables when practicable. Barley broth, rice sweetened with molasses, and other articles according to convenience, should be earnestly enforced.

The following tables supply an approximate average of the two classes of dietary:—

Temperate Scale,

where the daily or annual range of temperature is below 70° Fahr.

	oz.
Albuminous* (nitrogenous) . . .	5·0
Starchy (carboniferous) . . .	17·7
Total	22·7

Tropical Scale

where the daily or annual range of temperature is above 70° Fahr.

	oz.
Albuminous (nitrogenous) . . .	3
Starchy (carboniferous) . . .	12 to 14
Total (water free) . .	15 to 17

Several other elaborate tables are included in the paper, and a map is appended, showing most ingeniously the proposed distribution of dietaries on various foreign stations.†

Lime juice is now generally and with great advantage substituted for lemon juice. It has recently been suggested that this will keep equally well, without the 15 per cent. of alcohol, in the form of rum, by means of which it is at present believed to be

* A diet from which ready-formed fatty matter is excluded could not be regarded as perfect. The higher the latitude the more fatty should be the food.—C.A.C.

† There is no sound physiological reason why a Briton could not subsist in India on essentially the same kind of food which he has at home, only that it should, as a whole, contain more water, and less fat.—C.A.C.

preserved; and Mr. Baxter informed the House of Commons that "the principal medical officer of the Victualling Department had reported favourably upon the use of lime juice, without the addition of 15 per cent. of spirits. Pure juice had also been sent to the Island of Ascension, and returned in excellent condition."*

But in opposition to this purely official evidence, my friend, Mr Henry Leach, whose authority on this point is pre-eminent, states in a communication with which he has favoured me, that "the juice will not keep without alcohol unless very great care be exercised as to admission of air—practically for the mercantile marine, alcohol must be used, because care is not taken that after a bottle is opened it is finished off at once." And the "Lancet" objects to the proposed scheme, because the addition of rum will make the juice more popular among the men. Such being the facts of the case, we must hope that no short-sighted economy will interfere with the efforts so long and successfully made to keep at bay the greatest enemy of our naval service.

A leading article in the "Lancet"† refers to the present condition of our mercantile marine, and to the significant fact, that their ships are manned by a great proportion of foreigners.

The Liverpool shipowners have appointed a committee to enquire into the causes of this, which has issued a circular containing certain queries, to those possessing a special knowledge of the subject.

The "Lancet" considers that much of the disinclination of Englishmen to join this service may be found in dietetic deficiences, and states that although the American marine is immeasureably inferior to our own, the sanitary condition of their crews is better, and scurvy is almost an unknown disease.

The dietetic arrangements in our large schools is too much under the influence of public opinion to depart widely from approved standards; and the liberal terms paid by boys in these institutions ensures their being well fed. The combination of head work and active muscular exercise, which is the characteristic of the English system, demands good nourishment, and no one can pay a visit to any of them without being gratified by the healthy aspect of the pupils. The "Lancet" Sanitary Commissioner has recently undertaken a series of investigations into the internal arrangements of our principal public schools, and is able to give satisfactory details concerning their efficiency. As regards Marlborough College,‡ he writes:—

* "Medical Times and Gazette," August 7th, 1869.

† "Lancet," January 22nd, 1870. ‡ Ibid., April 16th, 1870.

"With respect to the dietary, we are convinced that it is both good in quality and sufficient in quantity. The breakfast consists of tea and coffee, with an unlimited amount of bread and butter. The quantity of milk is limited. Many boys arrange to have cold meat, eggs, and extra milk. At dinner, which is at half-past one, the allowance of meat is unlimited. The average consumption of meat for the half-year ending Christmas was 13½ ounces per head per day, and for the present half 14 ounces per head per day. The meat, except legs of mutton, is without bone. The supply of potatoes is also unlimited; and although green vegetables are used, they are not so freely taken as is desirable, chiefly because there is considerable difficulty in getting a regular supply. There is in the evening another tea and bread and butter meal. Weakly boys are ordered extra meat, wine and porter, by the surgeon, in which case there is no extra charge. The dinner beer averages three quarters of a pint per head, the bread one pound per head per day, and the butter 1¼ ounces. After foot ball, cricket, and other violent games, extra strong beer is served out in the evening, with a moderate supply of bread and cheese.

"This food appears to us ample, but it is a question whether it would not be possible to distribute the quantity in a different way. From half-past one until breakfast next day is too long to go without more substantial food; and if the meat at dinner could be divided, digestion would probably be more perfect. Nevertheless, it can hardly be said that the present distribution fails, as the boys generally go home in better health than they arrive at school. Perhaps it might be possible to have a soup or bread and cheese meal at night."

The report on Christ's Hospital* discloses hardly so satisfactory a state of affairs, for although the food is abundant and excellent, the general health of the boys suffers deterioration from London air.

"The boy's appetite is capricious in the extreme. Formerly this was more manifest than now. Time was when Tuesday was a general fast, because the pudding was not liked; and even now the consumption of any dish is influenced by its popularity. . . . . Practically speaking, there is no stint of food. The boys have as much meat as they can eat at dinner. But the consumption is miserably small as compared with other schools. The quantity cooked daily is calculated to give 4 ounces of cooked meat to every boy."

What more instructive comment can we have than this on the recent decision of the authorities of Christ's Hospital, not to follow the excellent example of the Charterhouse, and remove their school into pure country air. The lowered vitality attendant on a

* "Lancet," May 14th, 1870.

continuous residence in London must be familiar to all its inhabitants, and to subject boys to such depressing conditions must inflict serious injury, both on their mental and physical development.*

That the appetite of boys is frequently capricious, depends on the fact that they are often over indulged at home, and that so long as they have any money they will gratify their tastes by crowding the confectioners', usually shortly before dinner. But it may be a question whether the craving for sweets, so universally experienced at this time of life, may not be a just provision of nature, and may supply the carbonaceous principles so necessary for the perfection of muscular force. I should, therefore, be disposed to regard any repression in this direction as injudicious, and it would certainly be unpopular.†

In the school to which I have the honour to be attached as medical officer (Rugby) the diet is full and varied, and the health of the boys unusually good. Epidemics seldom occur to any extent, and the principal causes of sickness are what may be considered accidental, among which the only one bearing on our present subject is the form of dyspepsia, occasionally induced by the over liberal supply of hampers from home. The evils of this are sensibly commented on in a pamphlet on public school reforms, by "M. A. B.," who also refers to the necessity of giving boys something more substantial for breakfast‡ than is at present allowed. But our opinion would rather tend in the direction of supplying the more nourishing ingredients in the evening, as the principal meal is taken in the middle of the day.

We next approach the question of *the preservation of meat.* And here we are confronted by one of the greatest dietetic problems of the present day,—how to provide a due supply of animal food for

* There is no guarantee that the children located in the "cheap" boarding schools get the proper quantities of digestible albuminoids, fats, and carbo-hydrates, notwithstanding any advantages which may be expected from free competition and free trade; but the state should take care that free competition in boarding schools does not result in thousands of children being insufficiently fed as well as being badly instructed. Every school, private or public, should be kept on by virtue of a license, and should be subject to official visitation.—C.A.C.

† There is a natural longing for saccharine food evinced by almost every child. In the natural food of the infant, namely, the nutriment supplied from the maternal founts, sugar is present to the extent of nearly 40 per cent. (of dry weight). The instinctive fondness of sugar which is characteristic of early childhood, only very gradually fades away. Young people like sweet wines; in mature old age we prefer them dry.—C.A.C.

‡ A boy's breakfast could hardly be too substantial, and should be given to him immediately after his ablutions, etc., are performed.—C.A.C.

the poorer classes. It is a lamentable fact, that many of them rarely see meat from one year's end to the other, save on the occasion of some village festival, where their enormous consumption of the unwonted delicacy shows the keenness of their appreciation. Now, although a certain vigour of frame can undoubtedly be maintained on a vegetable diet, there is no doubt that the addition of a moderate quantity of flesh is highly requisite, as giving that reserve force necessary to avoid decay and encounter sickness. Vegetable feeders are enabled to assume much of the external qualities of health, and the Scotch and Irish* flourish well on their oatmeal and potatoes, but it must be remembered that in their case, the animal element is furnished by milk. But it is rather to the mental than the bodily endowments that these remarks apply—vegetarians, either by compulsion or choice, have never taken a high rank in intellectual pursuits, and it is an acknowledged fact that anyone who undertakes much head work must replenish the exhausted nervous tissue by good and varied diet. And this question now assumes a truly national importance from the diffusion of educational privileges following recent legislation. Could we but feed our people better, in how much higher degree would they not benefit from the advantages so liberally afforded them.

Hungry eyes from this country have for years been directed to South America, Australia, etc., where enormous supplies of meat are annually wasted, the carcasses being melted down for fat, as they cannot be put to any other use.† Mr. Philpott stated last year to the Food Committee of the Society of Arts, that he was thus in the habit of melting down from 1,000 to 1,500 sheep daily for months together; and in South America, "at least two millions of beasts are slaughtered annually for the fat, skin, and bone, the flesh of which could be supplied here at less than 2½d. per lb." How terrible is it to consider this unavoidable destruction of nutritive material, while our poor are starving at home; and it is perhaps strange that science has not yet furnished some method of cheap and effectual preservation.‡ The only one of these, how-

* Dr. E. Smith states that the Irish agricultural labourer receives more dry nutriment (for which he pays less money) than English and Scotch labourers. There is, however, a great deficiency of ready-formed fat in the diet of the Irish small farmer and agricultural labourer. No food is so much liked by them as very fat bacon, as it is so proper an adjunct to the over-farinaceous food. The desideratum in the diet of these people is, in my opinion, a cheap animal food very rich in fat.—C.A.C.

† Dr. Letheby.

‡ Dr. Letheby made enquiries relating to 121 patents for the preservation of food, not a dozen of which he found had proved useful to anyone.—C.A.C.

ever, which specially concerns us is that of Professor Gamgee, which has been introduced within the past year, and which at first was expected to solve the great questions under consideration.* By this process the animal is stupefied by carbonic oxide gas previous to being killed in the usual way. "After the carcass has been dressed, it is to be suspended in an air-tight chamber which is to be exhausted of air, and then filled with carbonic oxide gas, to which a little sulphurous acid has been added. It is to remain exposed to these gases for twenty-four, or even forty-eight hours, and is then to be hung up in dry air, after which it is said that the carcass will keep for many months, without perceptible change in taste or appearance." (Letheby.)

The "Food Journal"† states that "the results have been received with much favour by some of the largest salesmen in London; and the aspect and taste of the meat is such that it is largely bought by butchers;" but I regret to learn that subsequent experience has not confirmed these favourable results. It is most unfortunate that the first specimens of imported meat introduced into this country assumed such an offensive form in consequence of the inclusion of fats, that the tide of public opinion set in strongly against the whole system. The Australian cooked meat, however, which can be procured free of bone for 6d. a lb., is of excellent quality, and dressed in various ways, forms an unexceptional article of diet. Our poorer classes are notoriously fastidious about their food, but I am glad to learn that in many parts of England they purchase this so eagerly as to exhaust the supplies. Careful cooking is very essential to secure its full advantages, and I am glad to record two excellent papers on this subject in the "Food Journal" from the pen of Mrs. Larkins.‡ I may add, that the supplies furnished by Messrs. W. J. Coleman and Co., 13, St. Mary-at-Hill, are specially commended by the "Medical Times and Gazette,"§ for their fresh and wholesome qualities. Dr. Dewar, of Kirkaldy, who is so well known in connection with the antiseptic virtues of sulphur, has devoted much time and attention to investigating this subject, and has favoured me with a most interesting statement of his views.

He writes, "It is quite a usual practice now among many

* *Vide* "Lancet."
"British Medical Journal," January 15th, 1870.

† "The Food Journal," No. 1. February 5th, 1870.

‡ "Food Journal," February 5th, 1870, No. 1; and May 2nd, 1870, No. 4.

§ "Medical Times and Gazette," April 9th, 1870.

of my friends to fumigate grouse, etc., under which protection they can be transported to a distance in a much better preservation than is usual during hot weather. A friend of mine was desirous last summer of sending a haunch of venison to a distance of several hundred miles, but it was so stale as to make him doubtful as to whether it was worth the carriage; he applied sulphurous acid with a brush to it carefully, and it arrived at its destination in excellent condition. He likewise wrapped mutton in cloths which had been soaked in sulphurous acid, and this mode he found to be a very successful one. I have difficulty in seeing how meat, in a perfectly fresh state, which is what the public at present insist on being supplied with, can ever be brought home at a price which would make it any real boon to the country."

"I have been engaged in some very interesting experiments in the preservation of meats by smoking them with *selected* vegetable substances, and the results are considered to be highly successful. One of the greatest recommendations of this process is, that while it is inexpensive, it enables us to do with very little salt, indeed with no more than is requisite for the purposes of flavour. I enclose a morsel of salmon, which was treated by this method three months ago. Great numbers of people have tasted the fish, of which this is a portion, and without any exception it has been highly commended. You will perceive that it has very little salt about it. Flesh meats are quite as easily managed as fish."

The portion of salmon here referred to was of appetising smell and flavour, and much superior to the ordinary forms of kippered fish so frequently met with in Scotland, and I should feel sanguine that this mode of preparation may have a future of extended usefulness. But it is evident from a careful study of the evidence hitherto published, that the preservation of meat on an extended scale has not yet reached the point at which it can exert any real influence on the underfed population of our islands.*

Intimately connected with what has gone before is the question of the *injurious nature of diseased meat and milk.*

Is the flesh of animals, suffering from various forms of contagious disease, necessarily unfit for human food? Of course, when an animal is much wasted, or actually dies of disease, there can be no doubt that the flesh both in taste and appearance will indicate its injurious nature. But in the very different case of a

* The experiment of transporting live cattle from Australia was tried with great success some months ago. Ireland is a great cattle exporting country; yet many of the Dublin meat contractors find it profitable to import live oxen from Portugal. During the summer months a steamer full of these animals is landed in Dublin about twice in the month.—C. A. C.

beast slaughtered in the early stage, to check the spread of some contagious affection, cannot the meat safely be used for food?

Now, in the case of pleuro-pneumonia, Government has practically settled the question by prohibiting the sale of the flesh of animals at any stage of the malady. But regarding the necessarily unwholesome nature of these carcasses opinions differ, the bulk of testimonies inclining, however, to the affirmative. Mr. Simonds says:—*

"Not only is the flesh of animals affected with pleuro-pneumonia in its early stage, a safe article of food, but there is little or no risk of spreading the disease by allowing the flesh to be sent to the meat market."

But in the same article Mr. Gamgee expresses his deliberate conviction that such flesh is unwholesome, and Dr. Cameron,† in his report on public health thus expresses his decided opinion:—

"We are convinced that the flesh of animals killed whilst suffering from inflammatory and contagious diseases, such as, for example, pleuro-pneumonia, is unwholesome."

"The British Medical Journal," ‡ in a leading article, discusses the point whether it might or might not be advisable to extend Government regulations to the foot and mouth disease, as at present the right of selling meat from animals thus affected is entirely left to local justices of the peace. But as this flesh is quite unaltered in appearance, and as its consumption has never produced any evil effects, it would seem mere waste to deprive the community of a large quantity of animal food, as a concession to some fanciful conception of perils. The disease in question being rarely if ever fatal, this point would only affect the carcasses of foreign animals slaughtered at our ports to prevent the spread of infection.

The same article tells us that many practical agriculturists consider it a great mistake to prohibit the sale of the bodies of animals suffering from pleuro-pneumonia in an early stage of the disease, and the conflicting nature of the evidence may well make us pause before committing ourselves to a decided opinion on either side.

I am not aware that we have any data from which to derive pointed conclusions, but it is evident that at these early stages of disease the effects produced will only be such as to interfere with

* Quoted by Gamgee, in an article on food and disease. ("The Food Journal," No. 1, February 5, 1870.)

† Cameron: Half-yearly report on public health. ("Dublin Quarterly Journal," Nov. 1869.)

‡ "British Medical Journal," November 9, 1869.

the firmness and quality of the muscular fibre. It is probably not injurious, and differs greatly from that at later periods, when altered blood and the products of retrograde metamorphosis may really be productive of evil effects. We might even deem it to be within the limits of possibility to bring this flesh within the reach of safe consumption, by injecting various fluids into the vascular system immediately after death, and the influence of an exposure to high temperature has an undoubted influence in checking further septic changes. Vigilance in the detection of diseased meat is now carried on in certain districts with great energy; thus we find, on the authority of Dr. Letheby,* that during last year nearly 129 tons were condemned as unfit for food in the city of London alone, and in Dublin, in the year 1869, 147,203 lbs. of diseased meat, besides a large quantity of fish and fruit, were seized.†

Dr. Letheby, in the work from which I have already obtained so much instructive matter, has furnished the following characteristics of good meat:—

1st. "It is neither of a pale pink colour nor of a deep purple tint, for the former is a sign of disease, and the latter indicates that the animal has not been slaughtered, but has died with the blood in it, or has suffered from acute fever.

2nd. "It has a marbled appearance, from the ramifications of little veins of fat among the muscles.

3rd. "It should be firm and elastic to the touch, and should scarcely moisten the fingers; bad meat being wet and sodden and flabby, with the fat looking like jelly or wet parchment.

4th. "It should have little or no odour, and the odour should not be disagreeable; for diseased meat has a sickly cadaverous smell, and sometimes a smell of physic. This is very discoverable when the meat is chopped up, and drenched with warm water.

5th. "It should not shrink or waste much in cooking.

6th. "It should not run to water or become very wet in standing for a day or two, but should, on the contrary, dry upon the surface.

7th. "When dried at a temperature of 212°, or thereabouts, it should not lose more than from 70 to 74 per cent. of its weight, whereas bad meat will often lose as much as 80 per cent.

"The juice of bad meat is alkaline, or neutral to test paper, and the muscular fibre, under the microscope, is found to be sodden and ill-defined."

Another question, both of interest and importance, is whether the milk of animals suffering from foot-and-mouth disease may be

* "British Medical Journal," February 5th, 1870.

† During the present year (1870), the quantity of diseased, and otherwise unsound meat confiscated in Dublin averages nearly 50,000 lbs.—C.A.C.

taken with impunity. The "Lancet" * states that its use has proved fatal to calves and young pigs, and the "British Medical Journal" brings forward a good deal of evidence in support of the probability of the disease being thus communicated to the human subject. Thus Mr. J. Brendan Curgenven † reports a series of cases of what he calls "herpes contagiosus," in the first group of which the husband, wife, and wife's brother suffered from herpetic patches on the mouth and face, and various parts of the body, attended by considerable constitutional disturbance; and in the second, the house-maid, cook, and mistress were seized by a similar eruption in the throat. Although the milk cows in the neighbourhood were carefully inspected, no disease was discovered; but evidence was elicited, placing the fact of a former outbreak beyond doubt; and with this, Mr. Curgenven is disposed to connect his cases.

Mr. Mc Bride,‡ of Cirencester College, narrates twenty-one cases, from different sources, of the transference of this epizootic malady, seven of which arose from milk; while Mr. Fagan, of Belfast, communicates the particulars of a well marked instance of "pseudo-membranous stomatitis," produced by the milk of a cow suffering from mammitis; whether connected with cattle-plague is not stated.

On the other hand, we have the testimony of Mr. Lawson Tait,§ Dr. Whitmore,‖ and Mr. Holmes,¶ to show that the milk has been, and may be, freely used without deleterious consequences. Many of the above instances of supposed contagion were in all probability coincidences, and this I say with all the greater confidence, as I am enabled to refer to a group of cases of my own, in which many of the phenomena of cattle-plague were closely simulated. Five boys, occupying the same room, were attacked in succession with apthous and herpetic ulceration of the lips, gums, and tongue, spreading by contagion in the most marked manner. Careful inquiries and examination showed no trace of disease in the cows from whence they derived their milk, and I was unable to give any opinion as to the cause of so mysterious an occurrence. It is of course reasonable to suppose that the contact of pus or irritating secretions may tend to ulcerative action, but the changes met with

* "Lancet," October 23, 1869.

† "British and Medical Journal," November 6, 1869.

‡ "British Medical Journal," November 13, 1869.

§ Lawson Tait: "Medical Times and Gazette," October 23, 1869.

‖ Whitmore: "British Medical Journal," October, 1869.

¶ Holmes: "British Medical Journal," September 18, 1869.

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2nd. "It has a marbled appearance, from the ramifications of little veins of fat among the muscles.

3rd. "It should be firm and elastic to the touch, and should scarcely moisten the fingers; bad meat being wet and sodden and flabby, with the fat looking like jelly or wet parchment.

4th. "It should have little or no odour, and the odour should not be disagreeable; for diseased meat has a sickly cadaverous smell, and sometimes a smell of physic. This is very discoverable when the meat is chopped up, and drenched with warm water.

5th. "It should not shrink or waste much in cooking.

6th. "It should not run to water or become very wet in standing for a day or two, but should, on the contrary, dry upon the surface.

7th. "When dried at a temperature of 212°, or thereabouts, it should not lose more than from 70 to 74 per cent. of its weight, whereas bad meat will often lose as much as 80 per cent.

"The juice of bad meat is alkaline, or neutral to test paper, and the muscular fibre, under the microscope, is found to be sodden and ill-defined."

Another question, both of interest and importance, is whether the milk of animals suffering from foot-and-mouth disease may be

* "British Medical Journal," February 5th, 1870.

† During the present year (1870), the quantity of diseased, and otherwise unsound meat confiscated in Dublin averages nearly 50,000 lbs.—C.A.C.

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"With respect to the dietary, we are convinced that it is both good in quality and sufficient in quantity. The breakfast consists of tea and coffee, with an unlimited amount of bread and butter. The quantity of milk is limited. Many boys arrange to have cold meat, eggs, and extra milk. At dinner, which is at half-past one, the allowance of meat is unlimited. The average consumption of meat for the half-year ending Christmas was 13½ ounces per head per day, and for the present half 14 ounces per head per day. The meat, except legs of mutton, is without bone. The supply of potatoes is also unlimited; and although green vegetables are used, they are not so freely taken as is desirable, chiefly because there is considerable difficulty in getting a regular supply. There is in the evening another tea and bread and butter meal. Weakly boys are ordered extra meat, wine and porter, by the surgeon, in which case there is no extra charge. The dinner beer averages three quarters of a pint per head, the bread one pound per head per day, and the butter 1¼ ounces. After foot ball, cricket, and other violent games, extra strong beer is served out in the evening, with a moderate supply of bread and cheese.

"This food appears to us ample, but it is a question whether it would not be possible to distribute the quantity in a different way. From half-past one until breakfast next day is too long to go without more substantial food; and if the meat at dinner could be divided, digestion would probably be more perfect. Nevertheless, it can hardly be said that the present distribution fails, as the boys generally go home in better health than they arrive at school. Perhaps it might be possible to have a soup or bread and cheese meal at night."

The report on Christ's Hospital* discloses hardly so satisfactory a state of affairs, for although the food is abundant and excellent, the general health of the boys suffers deterioration from London air.

"The boy's appetite is capricious in the extreme. Formerly this was more manifest than now. Time was when Tuesday was a general fast, because the pudding was not liked; and even now the consumption of any dish is influenced by its popularity. . . . . Practically speaking, there is no stint of food. The boys have as much meat as they can eat at dinner. But the consumption is miserably small as compared with other schools. The quantity cooked daily is calculated to give 4 ounces of cooked meat to every boy."

What more instructive comment can we have than this on the recent decision of the authorities of Christ's Hospital, not to follow the excellent example of the Charterhouse, and remove their school into pure country air. The lowered vitality attendant on a

* "Lancet," May 14th, 1870.

continuous residence in London must be familiar to all its inhabitants, and to subject boys to such depressing conditions must inflict serious injury, both on their mental and physical development.*

That the appetite of boys is frequently capricious, depends on the fact that they are often over indulged at home, and that so long as they have any money they will gratify their tastes by crowding the confectioners', usually shortly before dinner. But it may be a question whether the craving for sweets, so universally experienced at this time of life, may not be a just provision of nature, and may supply the carbonaceous principles so necessary for the perfection of muscular force. I should, therefore, be disposed to regard any repression in this direction as injudicious, and it would certainly be unpopular.†

In the school to which I have the honour to be attached as medical officer (Rugby) the diet is full and varied, and the health of the boys unusually good. Epidemics seldom occur to any extent, and the principal causes of sickness are what may be considered accidental, among which the only one bearing on our present subject is the form of dyspepsia, occasionally induced by the over liberal supply of hampers from home. The evils of this are sensibly commented on in a pamphlet on public school reforms, by "M. A. B.," who also refers to the necessity of giving boys something more substantial for breakfast‡ than is at present allowed. But our opinion would rather tend in the direction of supplying the more nourishing ingredients in the evening, as the principal meal is taken in the middle of the day.

We next approach the question of *the preservation of meat*. And here we are confronted by one of the greatest dietetic problems of the present day,—how to provide a due supply of animal food for

* There is no guarantee that the children located in the "cheap" boarding schools get the proper quantities of digestible albuminoids, fats, and carbo-hydrates, notwithstanding any advantages which may be expected from free competition and free trade; but the state should take care that free competition in boarding schools does not result in thousands of children being insufficiently fed as well as being badly instructed. Every school, private or public, should be kept on by virtue of a license, and should be subject to official visitation.—C.A.C.

† There is a natural longing for saccharine food evinced by almost every child. In the natural food of the infant, namely, the nutriment supplied from the maternal founts, sugar is present to the extent of nearly 40 per cent. (of dry weight). The instinctive fondness of sugar which is characteristic of early childhood, only very gradually fades away. Young people like sweet wines; in mature old age we prefer them dry.—C.A.C.

‡ A boy's breakfast could hardly be too substantial, and should be given to him immediately after his ablutions, etc., are performed.—C.A.C.

the poorer classes. It is a lamentable fact, that many of them rarely see meat from one year's end to the other, save on the occasion of some village festival, where their enormous consumption of the unwonted delicacy shows the keenness of their appreciation. Now, although a certain vigour of frame can undoubtedly be maintained on a vegetable diet, there is no doubt that the addition of a moderate quantity of flesh is highly requisite, as giving that reserve force necessary to avoid decay and encounter sickness. Vegetable feeders are enabled to assume much of the external qualities of health, and the Scotch and Irish* flourish well on their oatmeal and potatoes, but it must be remembered that in their case, the animal element is furnished by milk. But it is rather to the mental than the bodily endowments that these remarks apply—vegetarians, either by compulsion or choice, have never taken a high rank in intellectual pursuits, and it is an acknowledged fact that anyone who undertakes much head work must replenish the exhausted nervous tissue by good and varied diet. And this question now assumes a truly national importance from the diffusion of educational privileges following recent legislation. Could we but feed our people better, in how much higher degree would they not benefit from the advantages so liberally afforded them.

Hungry eyes from this country have for years been directed to South America, Australia, etc., where enormous supplies of meat are annually wasted, the carcasses being melted down for fat, as they cannot be put to any other use.† Mr. Philpott stated last year to the Food Committee of the Society of Arts, that he was thus in the habit of melting down from 1,000 to 1,500 sheep daily for months together; and in South America, "at least two millions of beasts are slaughtered annually for the fat, skin, and bone, the flesh of which could be supplied here at less than 2½d. per lb." How terrible is it to consider this unavoidable destruction of nutritive material, while our poor are starving at home; and it is perhaps strange that science has not yet furnished some method of cheap and effectual preservation.‡ The only one of these, how-

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The "Food Journal"† states that "the results have been received with much favour by some of the largest salesmen in London; and the aspect and taste of the meat is such that it is largely bought by butchers;" but I regret to learn that subsequent experience has not confirmed these favourable results. It is most unfortunate that the first specimens of imported meat introduced into this country assumed such an offensive form in consequence of the inclusion of fats, that the tide of public opinion set in strongly against the whole system. The Australian cooked meat, however, which can be procured free of bone for 6d. a lb., is of excellent quality, and dressed in various ways, forms an unexceptional article of diet. Our poorer classes are notoriously fastidious about their food, but I am glad to learn that in many parts of England they purchase this so eagerly as to exhaust the supplies. Careful cooking is very essential to secure its full advantages, and I am glad to record two excellent papers on this subject in the "Food Journal" from the pen of Mrs. Larkins.‡ I may add, that the supplies furnished by Messrs. W. J. Coleman and Co., 13, St. Mary-at-Hill, are specially commended by the "Medical Times and Gazette,"§ for their fresh and wholesome qualities. Dr. Dewar, of Kirkaldy, who is so well known in connection with the antiseptic virtues of sulphur, has devoted much time and attention to investigating this subject, and has favoured me with a most interesting statement of his views.

He writes, "It is quite a usual practice now among many

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"I have been engaged in some very interesting experiments in the preservation of meats by smoking them with *selected* vegetable substances, and the results are considered to be highly successful. One of the greatest recommendations of this process is, that while it is inexpensive, it enables us to do with very little salt, indeed with no more than is requisite for the purposes of flavour. I enclose a morsel of salmon, which was treated by this method three months ago. Great numbers of people have tasted the fish, of which this is a portion, and without any exception it has been highly commended. You will perceive that it has very little salt about it. Flesh meats are quite as easily managed as fish."

The portion of salmon here referred to was of appetising smell and flavour, and much superior to the ordinary forms of kippered fish so frequently met with in Scotland, and I should feel sanguine that this mode of preparation may have a future of extended usefulness. But it is evident from a careful study of the evidence hitherto published, that the preservation of meat on an extended scale has not yet reached the point at which it can exert any real influence on the underfed population of our islands.*

Intimately connected with what has gone before is the question of the *injurious nature of diseased meat and milk.*

Is the flesh of animals, suffering from various forms of contagious disease, necessarily unfit for human food? Of course, when an animal is much wasted, or actually dies of disease, there can be no doubt that the flesh both in taste and appearance will indicate its injurious nature. But in the very different case of a

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But in the same article Mr. Gamgee expresses his deliberate conviction that such flesh is unwholesome, and Dr. Cameron,† in his report on public health thus expresses his decided opinion:—

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I am not aware that we have any data from which to derive pointed conclusions, but it is evident that at these early stages of disease the effects produced will only be such as to interfere with

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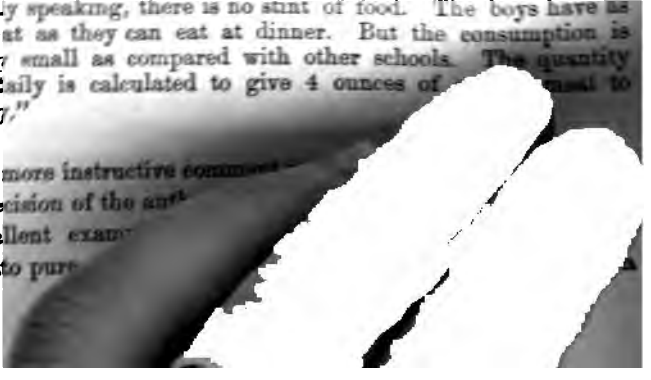

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below which wines were admitted at the one shilling duty.* The sulphate of potassa, introduced into sherry by the process of plastering, has a depressing action on the heart, and may do away with all the beneficial stimulating effects of the alcohol. In the case, therefore, of exhausting disease, it would be well to substitute Madeira, which contains little sulphate of potassa.

Several new kinds of wines have recently been introduced to the notice of the British consumer:—

The wines (and brandies) of Languedoc are praised by Dr. Thudicum.

The Auldana wine, produced in South Australia, is now considerably used in this country.

The Transylvanian wine, "Mediash," supplied by Max Greger, is said to possess much of the Rhenish quality.

Naussa, introduced by Mr. Denman, from the neighbourhood of Mount Olympus, is young and powerful.

Syrian wine, consisting of four sorts, have considerable merit, especially the "Vin doux Rosa du Mont Liban." 1864.

The Syrian champagne† is a pure unadulterated wine, of good flavour, and rather dry. (Bergman, Kern and Co., 32, Great Winchester Street.)

Vouvray,‡ a sparkling wine, from the Touraine, south of France, is stimulating, cheap and agreeable.

The so-called Hambro' sherry,§ which has been somewhat extensively circulated of late, is strongly denounced in a leader in the "Medical Times," which quotes from Mr. Gilbey's circular to show that it is unfit for consumption, and will only keep after the addition of sugar and coarse potato spirit. The introduction of this at a reduced or shilling duty, as proposed, would not only rob the revenue, but, considering that it is fortified up to 40 or 42 pér cent. of alcohol, would greatly encourage the practice of dram drinking in disguise.

Some valuable researches on beer have appeared in the pages of the "British Medical Journal,"‖ under the title of Reports on Malt Liquors. Samples of bitter ale and beer were obtained partly from public-houses and partly from brewers, and great differences were found both in the quality sold retail at the same price, as well as between it and the best beer sold by brewers. Thus, for instance, the variation in the ale sold at 4d. per quart is from 4·0 gr. to 7·10

* "Food Journal" for February and March.

† "Medical Times," June 11th, 1870.

‡ Ibid., December 18th, 1870. § Ibid., November 6th, 1870.

‖ "British Medical Journal," August 28th, 1869, and January 15th, 1870.

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the firmness and quality of the muscular fibre. It is probably not injurious, and differs greatly from that at later periods, when altered blood and the products of retrograde metamorphosis may really be productive of evil effects. We might even deem it to be within the limits of possibility to bring this flesh within the reach of safe consumption, by injecting various fluids into the vascular system immediately after death, and the influence of an exposure to high temperature has an undoubted influence in checking further septic changes. Vigilance in the detection of diseased meat is now carried on in certain districts with great energy; thus we find, on the authority of Dr. Letheby,* that during last year nearly 129 tons were condemned as unfit for food in the city of London alone, and in Dublin, in the year 1869, 147,203 lbs. of diseased meat, besides a large quantity of fish and fruit, were seized.†

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7th. "When dried at a temperature of 212°, or thereabouts, it should not lose more than from 70 to 74 per cent. of its weight, whereas bad meat will often lose as much as 80 per cent.

"The juice of bad meat is alkaline, or neutral to test paper, and the muscular fibre, under the microscope, is found to be sodden and ill-defined."

Another question, both of interest and importance, is whether the milk of animals suffering from foot-and-mouth disease may be

* "British Medical Journal," February 5th, 1870.

† During the present year (1870), the quantity of diseased, and otherwise unsound meat confiscated in Dublin averages nearly 50,000 lbs.—C.A.C.

taken with impunity. The "Lancet" * states that its use has proved fatal to calves and young pigs, and the "British Medical Journal" brings forward a good deal of evidence in support of the probability of the disease being thus communicated to the human subject. Thus Mr. J. Brendan Curgenven † reports a series of cases of what he calls "herpes contagiosus," in the first group of which the husband, wife, and wife's brother suffered from herpetic patches on the mouth and face, and various parts of the body, attended by considerable constitutional disturbance; and in the second, the house-maid, cook, and mistress were seized by a similar eruption in the throat. Although the milk cows in the neighbourhood were carefully inspected, no disease was discovered; but evidence was elicited, placing the fact of a former outbreak beyond doubt; and with this, Mr. Curgenven is disposed to connect his cases.

Mr. Mc Bride,‡ of Cirencester College, narrates twenty-one cases, from different sources, of the transference of this epizootic malady, seven of which arose from milk; while Mr. Fagan, of Belfast, communicates the particulars of a well marked instance of "pseudo-membranous stomatitis," produced by the milk of a cow suffering from mammitis; whether connected with cattle-plague is not stated.

On the other hand, we have the testimony of Mr. Lawson Tait,§ Dr. Whitmore,‖ and Mr. Holmes,¶ to show that the milk has been, and may be, freely used without deleterious consequences. Many of the above instances of supposed contagion were in all probability coincidences, and this I say with all the greater confidence, as I am enabled to refer to a group of cases of my own, in which many of the phenomena of cattle-plague were closely simulated. Five boys, occupying the same room, were attacked in succession with apthous and herpetic ulceration of the lips, gums, and tongue, spreading by contagion in the most marked manner. Careful inquiries and examination showed no trace of disease in the cows from whence they derived their milk, and I was unable to give any opinion as to the cause of so mysterious an occurrence. It is of course reasonable to suppose that the contact of pus or irritating secretions may tend to ulcerative action, but the changes met with

* "Lancet," October 23, 1869.

† "British and Medical Journal," November 6, 1869.

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§ Lawson Tait: "Medical Times and Gazette," October 23, 1869.

‖ Whitmore: "British Medical Journal," October, 1869.

¶ Holmes: "British Medical Journal," September 18, 1869.

The three great mistakes to be avoided are—

1. The excessive use of salt meat, which ought to be in great measure superseded by that preserved in tins, and which ought to be given every second, instead of every third day, as under present regulations.

2. Giving the same constituents of food in warm as in cold regions, instead of endeavouring to reduce the nitrogenous in favour of the more vegetable and less stimulating elements.

3. The spirit ration is not only unnecessary to comfort, but injurious to health, especially in the tropics, and might be replaced by coffee or lime-juice.

Greater variety ought to be carefully studied, and the use of fresh vegetables when practicable. Barley broth, rice sweetened with molasses, and other articles according to convenience, should be earnestly enforced.

The following tables supply an approximate average of the two classes of dietary:—

Temperate Scale,

where the daily or annual range of temperature is below 70° Fahr.

	oz.
Albuminous* (nitrogenous) . . .	5·0
Starchy (carboniferous) . . .	17·7
Total	22·7

Tropical Scale

where the daily or annual range of temperature is above 70° Fahr.

	oz.
Albuminous (nitrogenous) . . .	3
Starchy (carboniferous) . . .	12 to 14
Total (water free) . .	15 to 17

Several other elaborate tables are included in the paper, and a map is appended, showing most ingeniously the proposed distribution of dietaries on various foreign stations.†

Lime juice is now generally and with great advantage substituted for lemon juice. It has recently been suggested that this will keep equally well, without the 15 per cent. of alcohol, in the form of rum, by means of which it is at present believed to be

* A diet from which ready-formed fatty matter is excluded could not be regarded as perfect. The higher the latitude the more fatty should be the food.—C.A.C.

† There is no sound physiological reason why a Briton could not subsist in India on essentially the same kind of food which he has at home, only that it should, as a whole, contain more water, and less fat.—C.A.C.

preserved; and Mr. Baxter informed the House of Commons that "the principal medical officer of the Victualling Department had reported favourably upon the use of lime juice, without the addition of 15 per cent. of spirits. Pure juice had also been sent to the Island of Ascension, and returned in excellent condition."*

But in opposition to this purely official evidence, my friend, Mr Henry Leach, whose authority on this point is pre-eminent, states in a communication with which he has favoured me, that "the juice will not keep without alcohol unless very great care be exercised as to admission of air—practically for the mercantile marine, alcohol must be used, because care is not taken that after a bottle is opened it is finished off at once." And the "Lancet" objects to the proposed scheme, because the addition of rum will make the juice more popular among the men. Such being the facts of the case, we must hope that no short-sighted economy will interfere with the efforts so long and successfully made to keep at bay the greatest enemy of our naval service.

A leading article in the "Lancet"† refers to the present condition of our mercantile marine, and to the significant fact, that their ships are manned by a great proportion of foreigners.

The Liverpool shipowners have appointed a committee to enquire into the causes of this, which has issued a circular containing certain queries, to those possessing a special knowledge of the subject.

The "Lancet" considers that much of the disinclination of Englishmen to join this service may be found in dietetic deficiences, and states that although the American marine is immeasureably inferior to our own, the sanitary condition of their crews is better, and scurvy is almost an unknown disease.

The dietetic arrangements in our large schools is too much under the influence of public opinion to depart widely from approved standards; and the liberal terms paid by boys in these institutions ensures their being well fed. The combination of head work and active muscular exercise, which is the characteristic of the English system, demands good nourishment, and no one can pay a visit to any of them without being gratified by the healthy aspect of the pupils. The "Lancet" Sanitary Commissioner has recently undertaken a series of investigations into the internal arrangements of our principal public schools, and is able to give satisfactory details concerning their efficiency. As regards Marlborough College,‡ he writes:—

* "Medical Times and Gazette," August 7th, 1869.

† "Lancet," January 22nd, 1870. ‡ Ibid., April 16th, 1870.

"With respect to the dietary, we are convinced that it is both good in quality and sufficient in quantity. The breakfast consists of tea and coffee, with an unlimited amount of bread and butter. The quantity of milk is limited. Many boys arrange to have cold meat, eggs, and extra milk. At dinner, which is at half-past one, the allowance of meat is unlimited. The average consumption of meat for the half-year ending Christmas was 13½ ounces per head per day, and for the present half 14 ounces per head per day. The meat, except legs of mutton, is without bone. The supply of potatoes is also unlimited; and although green vegetables are used, they are not so freely taken as is desirable, chiefly because there is considerable difficulty in getting a regular supply. There is in the evening another tea and bread and butter meal. Weakly boys are ordered extra meat, wine and porter, by the surgeon, in which case there is no extra charge. The dinner beer averages three quarters of a pint per head, the bread one pound per head per day, and the butter 1¼ ounces. After foot ball, cricket, and other violent games, extra strong beer is served out in the evening, with a moderate supply of bread and cheese.

"This food appears to us ample, but it is a question whether it would not be possible to distribute the quantity in a different way. From half-past one until breakfast next day is too long to go without more substantial food; and if the meat at dinner could be divided, digestion would probably be more perfect. Nevertheless, it can hardly be said that the present distribution fails, as the boys generally go home in better health than they arrive at school. Perhaps it might be possible to have a soup or bread and cheese meal at night."

The report on Christ's Hospital* discloses hardly so satisfactory a state of affairs, for although the food is abundant and excellent, the general health of the boys suffers deterioration from London air.

"The boy's appetite is capricious in the extreme. Formerly this was more manifest than now. Time was when Tuesday was a general fast, because the pudding was not liked; and even now the consumption of any dish is influenced by its popularity. . . . . Practically speaking, there is no stint of food. The boys have as much meat as they can eat at dinner. But the consumption is miserably small as compared with other schools. The quantity cooked daily is calculated to give 4 ounces of cooked meat to every boy."

What more instructive comment can we have than this on the recent decision of the authorities of Christ's Hospital, not to follow the excellent example of the Charterhouse, and remove their school into pure country air. The lowered vitality attendant on a

* "Lancet," May 14th, 1870.

continuous residence in London must be familiar to all its inhabitants, and to subject boys to such depressing conditions must inflict serious injury, both on their mental and physical development.*

That the appetite of boys is frequently capricious, depends on the fact that they are often over indulged at home, and that so long as they have any money they will gratify their tastes by crowding the confectioners', usually shortly before dinner. But it may be a question whether the craving for sweets, so universally experienced at this time of life, may not be a just provision of nature, and may supply the carbonaceous principles so necessary for the perfection of muscular force. I should, therefore, be disposed to regard any repression in this direction as injudicious, and it would certainly be unpopular.†

In the school to which I have the honour to be attached as medical officer (Rugby) the diet is full and varied, and the health of the boys unusually good. Epidemics seldom occur to any extent, and the principal causes of sickness are what may be considered accidental, among which the only one bearing on our present subject is the form of dyspepsia, occasionally induced by the over liberal supply of hampers from home. The evils of this are sensibly commented on in a pamphlet on public school reforms, by "M. A. B.," who also refers to the necessity of giving boys something more substantial for breakfast‡ than is at present allowed. But our opinion would rather tend in the direction of supplying the more nourishing ingredients in the evening, as the principal meal is taken in the middle of the day.

We next approach the question of *the preservation of meat*. And here we are confronted by one of the greatest dietetic problems of the present day,—how to provide a due supply of animal food for

* There is no guarantee that the children located in the "cheap" boarding schools get the proper quantities of digestible albuminoids, fats, and carbo-hydrates, notwithstanding any advantages which may be expected from free competition and free trade; but the state should take care that free competition in boarding schools does not result in thousands of children being insufficiently fed as well as being badly instructed. Every school, private or public, should be kept on by virtue of a license, and should be subject to official visitation.—C.A.C.

† There is a natural longing for saccharine food evinced by almost every child. In the natural food of the infant, namely, the nutriment supplied from the maternal founts, sugar is present to the extent of nearly 40 per cent. (of dry weight). The instinctive fondness of sugar which is characteristic of early childhood, only very gradually fades away. Young people like sweet wines; in mature old age we prefer them dry.—C.A.C.

‡ A boy's breakfast could hardly be too substantial, and should be given to him immediately after his ablutions, etc., are performed.—C.A.C.

the poorer classes. It is a lamentable fact, that many of them rarely see meat from one year's end to the other, save on the occasion of some village festival, where their enormous consumption of the unwonted delicacy shows the keenness of their appreciation. Now, although a certain vigour of frame can undoubtedly be maintained on a vegetable diet, there is no doubt that the addition of a moderate quantity of flesh is highly requisite, as giving that reserve force necessary to avoid decay and encounter sickness. Vegetable feeders are enabled to assume much of the external qualities of health, and the Scotch and Irish* flourish well on their oatmeal and potatoes, but it must be remembered that in their case, the animal element is furnished by milk. But it is rather to the mental than the bodily endowments that these remarks apply—vegetarians, either by compulsion or choice, have never taken a high rank in intellectual pursuits, and it is an acknowledged fact that anyone who undertakes much head work must replenish the exhausted nervous tissue by good and varied diet. And this question now assumes a truly national importance from the diffusion of educational privileges following recent legislation. Could we but feed our people better, in how much higher degree would they not benefit from the advantages so liberally afforded them.

Hungry eyes from this country have for years been directed to South America, Australia, etc., where enormous supplies of meat are annually wasted, the carcasses being melted down for fat, as they cannot be put to any other use.† Mr. Philpott stated last year to the Food Committee of the Society of Arts, that he was thus in the habit of melting down from 1,000 to 1,500 sheep daily for months together; and in South America, "at least two millions of beasts are slaughtered annually for the fat, skin, and bone, the flesh of which could be supplied here at less than 2½d. per lb." How terrible is it to consider this unavoidable destruction of nutritive material, while our poor are starving at home; and it is perhaps strange that science has not yet furnished some method of cheap and effectual preservation.‡ The only one of these, how-

* Dr. E. Smith states that the Irish agricultural labourer receives more dry nutriment (for which he pays less money) than English and Scotch labourers. There is, however, a great deficiency of ready-formed fat in the diet of the Irish small farmer and agricultural labourer. No food is so much liked by them as very fat bacon, as it is so proper an adjunct to the over-farinaceous food. The desideratum in the diet of these people is, in my opinion, a cheap animal food very rich in fat.—C.A.C.

† Dr. Letheby.

‡ Dr. Letheby made enquiries relating to 121 patents for the preservation of food, not a dozen of which he found had proved useful to anyone.—C.A.C.

ever, which specially concerns us is that of Professor Gamgee, which has been introduced within the past year, and which at first was expected to solve the great questions under consideration.* By this process the animal is stupefied by carbonic oxide gas previous to being killed in the usual way. "After the carcass has been dressed, it is to be suspended in an air-tight chamber which is to be exhausted of air, and then filled with carbonic oxide gas, to which a little sulphurous acid has been added. It is to remain exposed to these gases for twenty-four, or even forty-eight hours, and is then to be hung up in dry air, after which it is said that the carcass will keep for many months, without perceptible change in taste or appearance." (Letheby.)

The "Food Journal"† states that "the results have been received with much favour by some of the largest salesmen in London; and the aspect and taste of the meat is such that it is largely bought by butchers;" but I regret to learn that subsequent experience has not confirmed these favourable results. It is most unfortunate that the first specimens of imported meat introduced into this country assumed such an offensive form in consequence of the inclusion of fats, that the tide of public opinion set in strongly against the whole system. The Australian cooked meat, however, which can be procured free of bone for 6d. a lb., is of excellent quality, and dressed in various ways, forms an unexceptional article of diet. Our poorer classes are notoriously fastidious about their food, but I am glad to learn that in many parts of England they purchase this so eagerly as to exhaust the supplies. Careful cooking is very essential to secure its full advantages, and I am glad to record two excellent papers on this subject in the "Food Journal" from the pen of Mrs. Larkins.‡ I may add, that the supplies furnished by Messrs. W. J. Coleman and Co., 13, St. Mary-at-Hill, are specially commended by the "Medical Times and Gazette,"§ for their fresh and wholesome qualities. Dr. Dewar, of Kirkaldy, who is so well known in connection with the antiseptic virtues of sulphur, has devoted much time and attention to investigating this subject, and has favoured me with a most interesting statement of his views.

He writes, "It is quite a usual practice now among many

* *Vide* "Lancet."
"British Medical Journal," January 15th, 1870.

† "The Food Journal," No. 1. February 5th, 1870.

‡ "Food Journal," February 5th, 1870, No. 1; and May 2nd, 1870, No. 4.

§ "Medical Times and Gazette," April 9th, 1870.

of my friends to fumigate grouse, etc., under which protection they can be transported to a distance in a much better preservation than is usual during hot weather. A friend of mine was desirous last summer of sending a haunch of venison to a distance of several hundred miles, but it was so stale as to make him doubtful as to whether it was worth the carriage; he applied sulphurous acid with a brush to it carefully, and it arrived at its destination in excellent condition. He likewise wrapped mutton in cloths which had been soaked in sulphurous acid, and this mode he found to be a very successful one. I have difficulty in seeing how meat, in a perfectly fresh state, which is what the public at present insist on being supplied with, can ever be brought home at a price which would make it any real boon to the country."

"I have been engaged in some very interesting experiments in the preservation of meats by smoking them with *selected* vegetable substances, and the results are considered to be highly successful. One of the greatest recommendations of this process is, that while it is inexpensive, it enables us to do with very little salt, indeed with no more than is requisite for the purposes of flavour. I enclose a morsel of salmon, which was treated by this method three months ago. Great numbers of people have tasted the fish, of which this is a portion, and without any exception it has been highly commended. You will perceive that it has very little salt about it. Flesh meats are quite as easily managed as fish."

The portion of salmon here referred to was of appetising smell and flavour, and much superior to the ordinary forms of kippered fish so frequently met with in Scotland, and I should feel sanguine that this mode of preparation may have a future of extended usefulness. But it is evident from a careful study of the evidence hitherto published, that the preservation of meat on an extended scale has not yet reached the point at which it can exert any real influence on the underfed population of our islands.*

Intimately connected with what has gone before is the question of the *injurious nature of diseased meat and milk.*

Is the flesh of animals, suffering from various forms of contagious disease, necessarily unfit for human food? Of course, when an animal is much wasted, or actually dies of disease, there can be no doubt that the flesh both in taste and appearance will indicate its injurious nature. But in the very different case of a

* The experiment of transporting live cattle from Australia was tried with great success some months ago. Ireland is a great cattle exporting country; yet many of the Dublin meat contractors find it profitable to import live oxen from Portugal. During the summer months a steamer full of these animals is landed in Dublin about twice in the month.—C. A. C.

beast slaughtered in the early stage, to check the spread of some contagious affection, cannot the meat safely be used for food?

Now, in the case of pleuro-pneumonia, Government has practically settled the question by prohibiting the sale of the flesh of animals at any stage of the malady. But regarding the necessarily unwholesome nature of these carcasses opinions differ, the bulk of testimonies inclining, however, to the affirmative. Mr. Simonds says:—*

"Not only is the flesh of animals affected with pleuro-pneumonia in its early stage, a safe article of food, but there is little or no risk of spreading the disease by allowing the flesh to be sent to the meat market."

But in the same article Mr. Gamgee expresses his deliberate conviction that such flesh is unwholesome, and Dr. Cameron,† in his report on public health thus expresses his decided opinion:—

"We are convinced that the flesh of animals killed whilst suffering from inflammatory and contagious diseases, such as, for example, pleuro-pneumonia, is unwholesome."

"The British Medical Journal," ‡ in a leading article, discusses the point whether it might or might not be advisable to extend Government regulations to the foot and mouth disease, as at present the right of selling meat from animals thus affected is entirely left to local justices of the peace. But as this flesh is quite unaltered in appearance, and as its consumption has never produced any evil effects, it would seem mere waste to deprive the community of a large quantity of animal food, as a concession to some fanciful conception of perils. The disease in question being rarely if ever fatal, this point would only affect the carcasses of foreign animals slaughtered at our ports to prevent the spread of infection.

The same article tells us that many practical agriculturists consider it a great mistake to prohibit the sale of the bodies of animals suffering from pleuro-pneumonia in an early stage of the disease, and the conflicting nature of the evidence may well make us pause before committing ourselves to a decided opinion on either side.

I am not aware that we have any data from which to derive pointed conclusions, but it is evident that at these early stages of disease the effects produced will only be such as to interfere with

* Quoted by Gamgee, in an article on food and disease. ("The Food Journal," No. 1, February 5, 1870.)

† Cameron: Half-yearly report on public health. ("Dublin Quarterly Journal," Nov. 1869.)

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the firmness and quality of the muscular fibre. It is probably not injurious, and differs greatly from that at later periods, when altered blood and the products of retrograde metamorphosis may really be productive of evil effects. We might even deem it to be within the limits of possibility to bring this flesh within the reach of safe consumption, by injecting various fluids into the vascular system immediately after death, and the influence of an exposure to high temperature has an undoubted influence in checking further septic changes. Vigilance in the detection of diseased meat is now carried on in certain districts with great energy; thus we find, on the authority of Dr. Letheby,* that during last year nearly 129 tons were condemned as unfit for food in the city of London alone, and in Dublin, in the year 1869, 147,203 lbs. of diseased meat, besides a large quantity of fish and fruit, were seized.†

Dr. Letheby, in the work from which I have already obtained so much instructive matter, has furnished the following characteristics of good meat:—

1st. "It is neither of a pale pink colour nor of a deep purple tint, for the former is a sign of disease, and the latter indicates that the animal has not been slaughtered, but has died with the blood in it, or has suffered from acute fever.

2nd. "It has a marbled appearance, from the ramifications of little veins of fat among the muscles.

3rd. "It should be firm and elastic to the touch, and should scarcely moisten the fingers; bad meat being wet and sodden and flabby, with the fat looking like jelly or wet parchment.

4th. "It should have little or no odour, and the odour should not be disagreeable; for diseased meat has a sickly cadaverous smell, and sometimes a smell of physic. This is very discoverable when the meat is chopped up, and drenched with warm water.

5th. "It should not shrink or waste much in cooking.

6th. "It should not run to water or become very wet in standing for a day or two, but should, on the contrary, dry upon the surface.

7th. "When dried at a temperature of 212°, or thereabouts, it should not lose more than from 70 to 74 per cent. of its weight, whereas bad meat will often lose as much as 80 per cent.

"The juice of bad meat is alkaline, or neutral to test paper, and the muscular fibre, under the microscope, is found to be sodden and ill-defined."

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Mr. Mc Bride,‡ of Cirencester College, narrates twenty-one cases, from different sources, of the transference of this epizootic malady, seven of which arose from milk; while Mr. Fagan, of Belfast, communicates the particulars of a well marked instance of "pseudo-membranous stomatitis," produced by the milk of a cow suffering from mammitis; whether connected with cattle-plague is not stated.

On the other hand, we have the testimony of Mr. Lawson Tait,§ Dr. Whitmore,‖ and Mr. Holmes,¶ to show that the milk has been, and may be, freely used without deleterious consequences. Many of the above instances of supposed contagion were in all probability coincidences, and this I say with all the greater confidence, as I am enabled to refer to a group of cases of my own, in which many of the phenomena of cattle-plague were closely simulated. Five boys, occupying the same room, were attacked in succession with apthous and herpetic ulceration of the lips, gums, and tongue, spreading by contagion in the most marked manner. Careful inquiries and examination showed no trace of disease in the cows from whence they derived their milk, and I was unable to give any opinion as to the cause of so mysterious an occurrence. It is of course reasonable to suppose that the contact of pus or irritating secretions may tend to ulcerative action, but the changes met with

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¶ Holmes: "British Medical Journal," September 18, 1869.

Customs contain many valuable observations, remarks * that diseases like rheumatism and gout, which cause so much suffering, "attract comparatively little attention in the sanitary statistics of the country, as they are seldom directly fatal." Dr. Dickson himself gives us a very useful contribution to the subject. He suggests that some attempts should be made to register the sickness as well as the mortality of the kingdom, "for which purpose the records of various institutions, and more especially of the poor law service, might be utilised."

The agreement in the proportion of deaths in town and country may possibly be a coincidence which a wider generalisation would cause to disappear. At the same time we must remember that this consideration would go to prove that the number of seizures in the country ought in proportion to the mortality to be greater than in the towns. It happens curiously enough, as remarked by Dr. Letheby (Report, page 20), that the number of deaths from violence and privation in the city of London is not larger than in the rest of the country. Are deaths from violence and privation, therefore, not preventible?

Dr. Stark remarks that "nature appears to compensate for the higher mortality by making the births and marriages increase with the deaths." But where there are more births there are more infants; and as the mortality of infants is higher than that of adults, the general death-rate must appear higher. In comparing two communities where the proportion of children is different, the birth-rate ought to be taken into consideration as well as the death-rate. This point is well illustrated by Dr. Letheby in his Report (pages 11—17).

Dr. Stark must hold that bowel complaints are preventible diseases, since they arise from from foul water; and, if such complaints are more common in the country, it is because towns in general have a better water supply than rural districts. The higher mortality of large towns, as a rule (for there are notable exceptions), proves that the evils of over-population and vitiated air outrun the remedies we have yet used; but we are not without encouragement. "In Bristol," says Professor Corfield, "before the improvements in the water supply, etc., the annual mortality from typhoid fever was 10 per 10,000 inhabitants, since these improvements it has been only 6·5. At Merthyr Tydfil a mortality of 21·33 has been reduced to 8·66; at Croydon, 15 to 5·5, etc."

* *See* Fourteenth Report of the Commissioners of Her Majesty's Customs on the Customs, London, 1870, p. 130.

The mere space here devoted to Dr. Stark's paper is a sufficient proof of my opinion of its great value. Criticism in sanitary matters should not be discouraged. More harm has been done by hasty dogmatism than by intelligent scepticism. Nothing has done more to fill the public with distrust of medical authority in sanitary matters than arrogant and consequential assertions that this or that doubtful point which is still an open question is now settled, or has been "incontestably proved," or "demonstrated beyond all cavil," merely because the doctor giving evidence has written a paper or delivered a lecture upon the subject, containing arguments which he imagines to be conclusive. As long as men of experience and ability disagree upon a question, no one without gross conceit has a right to imagine it settled, much less to call upon the public to endorse his theory by punitive enactments.

Dr. Stark, as well as Dr. Gairdner, has called attention to the mischief of sinks and waterclosets ventilating through the buildings, or through common staircases. A watercloset should either be separate from the house or close to it as a projection, yet outside its walls and having its own means of ventilation; and as long as common drains and sewers communicate, our system of drainage must be liable to carry disease from one part of a town to another.

The reports of the River Commissioners* have the common features of Parliamentary Papers—many valuable facts supported upon lengthy and circumstantial evidence. The labours of the Commissioners, Major-General Sir W. Denison, Dr. E. Frankland, and Mr. J. Chalmers Morton, have been principally devoted to the Mersey and the Ribble, with their tributaries. In this district, so populous and full of manufactories, the evils of river pollution amount in many places to an intolerable nuisance. These small rivers have been used, not only as sewers for carrying off the filth of the large towns and villages, but also of getting rid of the endless variety of mineral and animal matter used in the different mills and manufactories. Nor is it often easy to apply prohibitive or remedial measures, considering the danger of deterring capital from new undertakings, and subjecting manufacturers to restrictions not in force elsewhere. The self-purifying oxidation of rivers is shown to be too feeble to be of much assistance to us.

The annoyance from mineral impurities is greater than we could

* First and Second Report of the Commissioners to Enquire into the best means of Preventing the Pollution of Rivers. ("Parliamentary Papers.") London, 1870.

have believed; but the principal danger to health undoubtedly arises from the great quantities of sewage mingled with the brooks and rivers. A number of remedies and methods of prevention are discussed; but it would be impossible, without entering into details of nearly the same length as those in the reports, to give any description of these appliances. The dry-earth-closet system is declared to be the best, but was found to do much better for institutions, villages, and camps, and to be unfitted to the circumstances of large towns. The treatment of sewage with chemical agents seems likely to be too expensive.

Mr. Stanford, in some papers in the "Chemical News" (June to October, 1869) has proposed a plan which has met with the approval of Dr. Parkes. Mr. Stanford has remarked that the charcoal of sea-weed is a powerful deodoriser, and that if added to dry earth, one-fourth only of the dry earth otherwise necessary is required. The char can be used many times, and a number of products extracted during the process of sufficient commercial value to make the plan pay at least its expenses. The demand for kelp would revive, and Mr. Stanford thinks we could obtain a sufficient supply to enable the process to come into general use.

The Commissioners give some striking evidence on the success of downward filtration. The process of purification which goes on is essentially one of oxidation, the organic matter being to a large extent converted into carbonic acid, water, and nitric acid. In some experiments upon the filtered sewage, it was found that it actually equalled or surpassed in purity, from organic ingredients, the water which is sometimes supplied to London for domestic purposes. Like most commissioners and writers, they occasionally point out the errors of their predecessors. The statement of the Third Report of the Commission appointed to enquire into the best mode of distributing the sewage of towns, 1865, maintained that a gallon of drainage water contained much about the same amount as a gallon of the sewage. This is, however, stated to be the result of a defective analysis, and the Commissioners are inclined to look to the purification of sewage by irrigation as at once the best and the most profitable way of getting rid of the difficulty. If the soil itself acts as a filter or a deodoriser, it acts much more efficiently when assisted by the countless absorbent rootlets of growing plants.

"Sewage traversing the soil undergoes a process to some extent analogous to that experienced by blood passing through the lungs in the act of breathing. A field of porous soil irrigated intermittently virtually performs an act of respiration, copying, on an

enormous scale, the lung action of a breathing animal; for it is alternately receiving and expiring air, and thus dealing as an oxidising agent with the filthy fluid which is trickling through it. And a whole acre of soil, three or four feet deep, presenting within it such an enormous lung surface, must be far superior as an oxidiser for dealing with the drainage of 100 people to any filter that could be practically worked for this purpose."

The justice of these remarks is shown by actual analyses of effluent water, which issues, bright, pure, and sparkling, from the fields, leaving its organic and inorganic materials to assist the present growth of vegetation, and enrich the soil for future crops.

The vast waste of valuable manure which is now allowed to pollute our rivers is pointed out in a very impressive manner. It is much to be regretted, even on sanitary considerations, that people in this country seem so little aware of the value of decaying vegetable and animal matter for manure. There is some very striking evidence given that such sewage irrigation practised in the open fields is not injurious to health. "No locality can be named in which typhus, enteric fever, dysentery, or other zymotic diseases —diseases generally attributable to foul emanation—has been traceable to irrigation with town sewage." (Report I., p. 128.) Sewage irrigation has been used near Piershill without producing either fevers, dysentery, or cholera; and, during 1866, when the cholera was prevalent in some parts of North London, sewage was constantly poured over the irrigated fields of Lodge Farm, but no case of cholera happened at the farm or near it.

No evidence has been as yet published by the Commissioners as to the possible danger of sewage irrigation becoming the means of introducing entozoa into the bodies of man or of animals. As night soil is much used as a manure in Belgian agriculture, it would be interesting to know if entozoa are more common in that country.

[I unwillingly pass over a number of excellent suggestions as to the purification of streams from the refuse of manufactories, which in most cases are more destructive to comfort than to health.]

The Commissioners recommend that a more stringent Act should be passed to prevent the discharge of polluting substances into streams, and that all the rivers and streams in England be placed under the charge of a central board of three persons, who should see that all enactments relating to the use of running water be enforced, and that additional powers be given to corporations, local boards, manufacturers, and others, to compel the sale of land for the purpose of cleansing sewage or other foul liquids by filtration or otherwise, and that the board should also exercise a surveillance

over the water supply of towns. The incompetency of the present local bodies to deal with such questions is admitted throughout the Report, though the Commissioners propose to adhere to existing known and recognised divisions, to accept the parish as the unit, and to hold the parish officers responsible for the state of the rivers and streams passing through or by it.

Dr. Alfred Carpenter, of Croydon, thinks 100 acres sufficient for the disposal by irrigation of the sewage of 10,000 people.

At Aldershot* eighty-nine statute acres of waste land have been reclaimed at a cost of fifty pounds per acre. On this land, which is manured from the camp sewage, grass, potatoes, and other vegetables are cultivated with such success that the land pays a rental of £25 per acre. From the analysis of Professor Able, it appears that before irrigation the sewage water held 20¼ grains per gallon of nitrogen in the form of ammonia, but the effluent water contains only ⅛ grain, and is so clear and sparkling that it is used by the cottagers around for domestic purposes. Though the smell of the fields was occasionally disagreeable, it had not been found to produce illness.

Messrs. J. A. Wanklyn and E. T. Chapman have published a clearly-written little book on water analysis, which has this year come to a second edition. I have gone over most of the processes of analysis described, and found the directions in general easily followed. The disagreement of chemists as to the proper method of detecting organic impurities in water is a source of much difficulty to the practical sanitarian. It contains at the end a useful chapter on the purification of water.

Mr. Myers, who has gained a prize for an essay on the Etiology and Prevalence of Heart Disease in the British Army, asserts that the excess of that malady is almost entirely due to the pressure of the uniform and belts. Since the Crimean war much has been done to diminish the pressure of soldiers' dresses, and to distribute the weights he has to carry in a more convenient manner. This subject is well discussed in the last Army Medical Report† pp. 277—285. There seems no diminution in aneurismal disease since these changes were made.

A great part of Dr. Dobell's book‡ deals with subjects out of

* The Aldershot Sewage Farm ("Parliamentary Papers"). London, 1870.

† Army Medical Department Report for the year 1868. London, 1870.

‡ "On Diet and Regimen in Sickness and Health, and on the Interdependence and Prevention of Diseases and the Diminution of their Fatality." By Horace Dobell, M.D., etc., etc. Fourth Edition, much Enlarged. London, 1870.

our section; but the second, eighth, and ninth chapters more especially treat of the prevention of diseases. Speaking of the analysis of a number of cases of winter cough, which in our climate keeps so many people in misery and alarm, and lays the foundation of more serious maladies, Dr. Dobell remarks:—

"If, then, these unfortunate sufferers from *winter cough* could have been protected from sudden changes of temperature, fogs, mists, cold winds, draughts, wet feet, and wet coats and dresses, 72 per cent. would have kept free from their coughs. It would seem strange if we could not find means of protection against such common-place influences. In truth, there is no deficiency of means of protection against them; and it is because of the very common-place character of these means of protection and of the influences themselves that both are so much neglected and undervalued."

Dr. Dobell then points out the different means of avoiding the chills to which we are so much exposed in our variable climate. He takes advantage of Professor Tyndall's lecture on "Dust and Disease," to enforce the advantage of respirators which Dr. Dobell has long advocated. The chapter on "Disinfection" gives practical instructions for medical men and patients for preventing the spreading of catching diseases. In the course of five pages a great variety of precautions are pointed out, one or other of which are extremely liable to escape the most vigilant attention. After pointing out the different media through which contagious diseases are communicated, Dr. Dobell remarks very justly:—

"It is probable that no infectious or contagious disease would spread if all these media were promptly disinfected. The difficulty lies, not in disinfecting any one of them when it is specially submitted to us, for that is easily done, but in keeping up such a rigorous system of disinfection around the sick person, that none of these media should escape disinfection; for common sense tells us that if only one escapes, the protection from disinfection may be lost."

Dr. Angus Smith's* "Disinfectants and Disinfection" is a good book. The author has gone over the whole subject both as a thinker and a worker, has narrowly measured the extent and bounds of our knowledge, and shows a prudent wariness in passing beyond them. Of course there must be many questions left unsolved in the present hazy state of etiology; and it will require a large number of exact experiments to determine the value of different disinfectants. Whether one can be made good for all

* "Disinfectants and Disinfection," by Robert Angus Smith, Ph. D., F.R.S., F.C.S. Edinburgh, 1869.

purposes, or whether some have virtues against one kind of contagion and little or none against another? At present they seem to be often used at random; one man favours chlorine; another carbolic acid, and so on. I am sorry not to be able, from want of space, to reproduce a few of Dr. Angus Smith's experiments and suggestive remarks; for with a writer who has so compact a style one must quote; it is in vain to try to condense.

Dr. Smith points out that the air issuing from sewers or otherwise charged with unhealthy emanations can be purified by filtration through charcoal.

"The charcoal, especially if platinised, would extract all the poisonous substances. It is not yet known how far this process is manageable. Charcoal is now used as a purifier of sewer gases, which afford it a wider field for its activities; the gases which leave the sewer pass first through it, and enter the air free from odour and danger."

"It may be remarked," he says in another place, "that the mere filling of a room with fresh air is not sufficient to render it pure; it seems quite necessary that the air should play about, and that the room should be filled and refilled frequently. If the whole oxygen of the air acted with equal power one would scarcely expect this result. It is explained, however, by supposing that one portion, and that very small, of the oxygen of the atmosphere is very active, and it is sufficient if even a very small portion of that comes in contact with the surfaces in the room which require to be cleansed, by having that organic matter with which they become plastered oxidised and destroyed."

On the subject of disinfectants for common use, Dr. Angus Smith remarks—

"My belief is strong in common salt. The laboratory experiments bear much in its favour. I have neglected however to try it on a large scale, and must wait till it is tried. For constant use, antiseptics or colytics that prevent decomposition are best, even although they do not destroy smells already formed. Chloride of lime has been repeatedly said to be the most destructive when decomposition is already present, and Condy's fluid permanganate still more elegantly so.

"Carbolic acid is most easily and cheaply managed when people don't object to the smell. It may be remembered that, as a rule, when we smell it we are safe from objectionable organic matter. Such is the belief."

It is to be regretted that, as intimated in this book, Dr. Smith is not ready to go on with the subject and complete the researches which he has so well commenced.

In the Sixth Report on the Alkali Act published this year Dr.

R. A. Smith has entered upon the subjects of the analysis of impure air and of rain water, topics which are of great interest to hygienic science.

Dr. Thorburn's little book* contains sixty pages of information and statistics, carefully chosen from the best and newest sources. Dr. Thorburn has found a fair field for his powers of sarcasm in exposing the monstrous mis-statements of a class of sophists who seem to have been too successful in alarming popular credulity. "According to the 'Manchester Guardian' of October 1st," writes Dr. Thorburn, "at least two thousand persons in the parish of Bethnal Green have refused to have their children vaccinated."

The Vaccination Act has worked well in Scotland, in spite of some difficulties and hardships in the islands and thinly populated districts, which might be the subject of special provision. From the Supplement of the Registrar-General to the Monthly and Quarterly Returns for 1869, it appears that only one hundred deaths from small-pox took place in 1869. The number of certificates of constitutional insusceptibility was 0·240 in 1868; in 1864 it was 0·608, a difference not easy to explain.

Mr. Squire, writing in the "Lancet," of August 14th, 1869, finds that the rise of temperature in vaccina, commences with the appearance of the vesicle; by the eighth day it generally exceeds 100°, the pulse rising to one hundred and fifty, and the respiration to fifty.

Several observers have discussed the question of the transmission of constitutional diseases by human vaccination. Dr. Braidwood† considers such transmissions unproved, while Dr. Blanc‡ insists that occasional communication of syphilis in vaccine matter is beyond denial. Dr. Thorburn shows satisfactorily that such transmission must be very rare, since its possibility has been denied by observers like Mr. Acton, Mr. Ceely, Dr. Farr, Mr. Marston, Dr. West, Dr. Williams, and many other eminent medical men; nevertheless he mentions seven who have seen what they consider evidence

* "Vaccination, a condensed Summary of the Evidence in its Favour, and of the Objections urged against it," by J. Thorburn, M.D., Lecturer on the Diseases of Women and Children at the Manchester Royal School of Medicine, &c.; London, 1870.

† "Animal Vaccination," by P. M. Braidwood, M.D., of Birkenhead, British and Foreign Medico-Chirurgical Review, April, 1870.

‡ "Compulsory Vaccination, an Enquiry into the present Unsatisfactory Condition of Vaccine Lymph, and a Remedy proposed," by Henry Blanc, M.D., F.R.G.S., Staff Assistant Surgeon, Bombay Army, Superintendent of Vaccination, Western Circle, Bombay: London, 1869.

of its transmission, and one at least who appears on his list of those who deny it has altered his opinion. This is no other than M. Ricord, who, in 1856, answered Mr. Simon's question as to the possibility of vaccinal syphilis by a very decided "non, non"—but who now regards it as an accomplished fact. Such transmission is rendered very mysterious, if not doubtful, by the fact that attempts have been made to ascertain by direct experiment both in France and Austria, whether syphilis could be inoculated through the blood or lymph of persons suffering from syphilitic disease, and that these experiments have failed. We may congratulate ourselves that in this country no one is likely to increase his reputation by putting the health of his fellow creatures into danger in order to settle doubtful questions in science. No one denies that the communication of syphilis through vaccine matter is an event of very rare occurrence, but as it is clear that by a little caution its possibility may be entirely avoided, it would be imprudent to deny it utterly.

Dr. Braidwood and others have recommended the use of cow-pox lymph instead of human lymph. There is no space here to describe the methods of procuring heifer's lymph, which the reader will find well treated of in the article on animal vaccination by Dr. Braidwood in the British and Foreign Medico-Chirurgical Review.

It appears from the observations of Blanc and Braidwood, that vaccination from the lymph of the heifer is somewhat later in coming to maturity, though the inflammatory process is more vigorous, and that it leaves a better marked cicatrix. No accident seems to result from animal vaccination, and veterinary surgeons are of opinion that there is no likelihood of any malady passing from the calf to the human subject. Both gentlemen are very decided in their theses that humanised lymph of long standing has lost much of its protective power, and they agree with Dr. Ballard that this loss of power occurs even when the utmost care is taken in the selection of the human vaccine matter. Mr. Simon, to whom we all owe so much for enforcing in his admirable "Health Reports," the necessity for greater care in vaccination, seems to be of the same opinion. In the Prussian army, "the vaccinations tested by eventual resusceptibility to cow-pox, were not half so stable as the vaccinations of 1813."

It still remains an open question, whether the increased susceptibility to small-pox and to vaccination, as well as the increased mortality from small-pox amongst the vaccinated observed since the beginning of this century, be not owing to the greater carelessness of vaccinators. Mr. Simon has shown that fifty per cent. of

those vaccinated present imperfect cicatrices, and much of the lymph in use has probably lost some of its protective power by improper selection. It may still be true, what the advocates of animal vaccination are ready to deny, that well selected human lymph affords as good a protection as that of the calf. On this point there does not seem to be a large array of comparative observations.

Dr. Cameron, in his report on Public Health in the "Dublin Quarterly Journal of Medicine," November, 1869, remarks that small-pox, which used formerly to cost Ireland from six to seven thousand lives annually, has now almost disappeared; this is wholly owing to careful vaccination with human lymph. At any rate animal vaccination appears to be free from danger, and to afford a protection against small-pox equal, if not superior, to that given by the human lymph, and it renders the transmission of any constitutional disease impossible, a fact which might help to make it popular. It is of course easier to procure lymph from the human arm; but should a large quantity of vaccine matter be required to meet a sudden demand, as in the case of the late alarming epidemic of small-pox in Paris, it can be procured more speedily and in greater quantity from the heifer. Calves of from six to eight weeks old are used. The lymph produced is smaller in quantity in each vesicle; but in one heifer as many as two hundred punctures can be made, from which six hundred people could be vaccinated. On the fifth day the lymph in the vesicle is strongest; at St. Petersburgh, with lymph taken on this day, it is said that only two per cent. of failures occurred; on the fourth and seventh days no more than four per cent., which is as good as the average success with the best human lymph. The advocates of animal vaccination recommend that officers be appointed to have ready supplies of heifer-lymph in the principal centres of population of the United Kingdom.*

* Since the above was written the Twelfth of Mr. Simon's Medical Reports has appeared, containing a paper on Vaccination, which it is impossible entirely to leave unnoticed till next year. Dr. Seaton has visited Paris, Brussels, Rotterdam, and Amsterdam, in order to examine the question. The result is most unsatisfactory for the cause of animal vaccination. Dr. Seaton affirms that lymph furnished direct from the heifer begins to lose its activity in twenty-four hours, and that the number of failures from heifer to arm was in Paris three times greater, and at Rotterdam twenty times greater than in vaccination from arm to arm. Dr. Seaton remarks, "That if practised and most scrupulously careful vaccinators, anxiously endeavouring to make their experiment successful and neglecting no known precaution for the purpose, find after two years' experience that in vaccinating direct from the heifer to the arm they are obliged in one-eighth of their cases to vaccinate a second time before they can produce any effect, and that in the end very nearly one-

The means of propagation of cholera forms a question as much discussed as ever. Dr. Bryden and Dr. D. B. Smith still hold that the facts known about the diffusion of cholera cannot be accounted for by contagion alone; while the other side is maintained by Dr. Cunningham, Dr. John Murray, and Mr. Macnamara. The last-mentioned gentleman believes that cholera is mainly propagated by drinking-water being contaminated with cholera dejecta.* The discussion of this question does not belong to me, though, as in several reviews on works on cholera in the "Edinburgh Medical Journal,"† I have taken up a somewhat sceptical position, it can scarcely be expected I should enter with enthusiasm into the many theoretical suggestions which have been made, how to check the spread of this terrible malady. It is likely, from the present state of medical opinion, based upon a more or less superficial knowledge of cholera, that when threatened with an epidemic, some attempts at quarantine may be made; and perhaps it would be well to settle the period of incubation. The Board of Supervision for the Relief of the Poor in Scotland, who administer the Public Health Act, demanded no more than three days for their futile quarantine.‡ Mr. Macnamara gives six days, Dr. Guy a week, as the time of incubation; but, as shown in the "Edinburgh Medical Journal,"§ if contagion be insisted upon in every case, the period of incubation must not unfrequently be much longer. Sometimes we are told the germ of infection remains dormant for many days; in others it acted in a few hours; and choleraic diarrhœa is stated by some authorities to be as dangerous for contagion as cholera itself. Ten days were assigned by one military surgeon as a sufficient period for the disease to exhaust itself; but it appeared after thirteen days' removal from the seat of contagion, and this in the hills near Sabathoo, where a cholera epidemic has never shown much power. The Constantinople conference declares the period of incubation to be generally short, but it may be prolonged more than twenty days; and articles kept several months were believed still to retain contagious power.

fourth of the children who are infected in this way are sent out with that imperfect degree of protection which is afforded by only one or two vaccine vesicles—it must be obvious that by the adoption of such a practice we should be greatly weakening our defences against small-pox. The chances to each individual of a full protection would be very largely diminished, and the danger to the community of spreading small-pox greatly increased, by the number of half-protected persons amongst us."—(W. W. Ireland.)

* See Report from Bengal for full particulars.—ED.

† February, 1868; July and August, 1869; February and June, 1870.

‡ "Twenty-first Annual Report," p. 12.

§ August, 1869, p. 153.

Dr. Parkes, in his report on Hygiene, in the "Army Medical Report" (p. 231), mentions a case where the crew of a ship began to be infected twenty-four days after leaving Calcutta.

It is admitted that chlorine has no disinfecting power against cholera. Mr. Macnamara has proposed sulphate of iron.

"Supposing," he writes, "we take a fresh cholera evacuation, dilute it with water, and allow it to stand in a warm place for a few hours, we shall, on examining it, find it to be alkaline, and under the microscope full of vibriones, the molecular particles of the organic material being in active movement. If we render this alkaline fluid acid, as by the addition of sulphate of iron, the infusoria and molecular action are instantly destroyed, and as long as the fluid remains acid the latter will not re-commence. I maintain, not from conjecture, but observed facts, that cholera dejecta treated in this way are harmless, and may be swallowed with impunity, and probably digested and assimilated as any other equal quantity of iron and organic matter would be."

Mr. Macnamara also states his belief that in water slightly contaminated by cholera stuff, the organic infecting matter of cholera will most certainly become oxidised on passing through well-constructed filter beds. At the end of Mr. Macnamara's work on Cholera there is a description of a new kind of filter, which has been approved of by the Indian Government.

Contagious Diseases Act.

There has been a vehement controversy, carried on in great part by a class of writers who may be called gynagogues, from their desire to arouse jealousy, irritation, and conflicting interests between the sexes, over the Contagious Diseases Act. Medical science has gained little or nothing from the dispute. The question in debate is rather one of morals and politics than of medicine.

Syphilis and gonorrhœa are of all diseases the most easily prevented. Syphilis, though in our days not often the direct cause of death, is a very frequent cause of ill health, not only to those who have incurred it by their own fault, but to innocent victims and their offspring. The frightful consequences of this disease in our army and navy are well known, because they cannot readily be concealed; the evils it inflicts upon a part of our civil population are not less great, though not so readily exhibited by statistics.

Two remedies have been advocated, which are of none the less efficacy that they are extremely simple. One of them is increased hospital accommodation, and other arrangements for the relief of diseased prostitutes. Mr. Acton* shows that this is much neglected,

* "Prostitution, considered in its Moral, Social, and Sanitary Aspects," by William Acton, M.R.C.S., &c., 2nd edition: London, 1870. Pp. 77—83.

even in London, where prejudices on this score have less force. In the provinces matters are still worse.

The pitiful notion that, because venereal disease is in most cases the result of illicit intercourse, it is wrong to do anything for its prevention, and even discreditable to assist in its cure, does not require exposure to medical readers. It seems probable that if suitable hospitals were provided, and if the women who take advantage of them were treated with forbearance and gentleness, they would find it better to resort to them than to scatter disease amongst others, and prolong and intensify their own.

The second means of prevention is careful ablution, both on the part of the prostitute and those who seek her company. Dr. Balfour has recommended "that all brothels, beershops, or public houses, where the women congregate for the purposes of prostitution, should be compelled to have a lavatory, so that the men might use it at the time."

It appears from Mr. Acton's book that lotions, etc., are used by prostitutes on the Continent. He gives several recipes, one of which is much used at Bordeaux:—

"Take of alum, half-an-ounce; sulphate of protoxide of iron, 15 grains; sulphate of copper, 15 grains; compound aromatic alcohol, 1½ drachms; water, 32 ounces. Mix."

"The compound aromatic alcohol consists of a strong solution of essential oil of lemons, mint, lavender, &c., in alcohol, at 85 C."

There is no reason to doubt that perfect ablution with ordinary soap and water, after intercourse with a diseased person, would prevent contagion, and that medicated lotions are only needed where excoriations have been produced.

While allowing a wide efficacy to such simple measures as these, it is useless to expect more than a limited amount of good from them. They would still leave a vast amount of evil to be combated.

A more thoroughgoing measure has been recommended—

"Let us take the case of London," says Mr. Acton; "in this city, as the return shows, there are 6,515 women known to the police to be prostitutes; it is not too much to say that out of every four of these women one at least is diseased, so that we have among us more than 1,500, at a moderate computation, human beings daily engaged in the occupation of spreading abroad a loathsome poison, the effects of which are not even confined to the partakers of their sin, but are too often transmitted to their issue, and bear their fruits in tottering limbs and tainted blood. Broken constitutions, sickly bodies, and feeble minds, are times out of number the work of the prostitute."

It is no marvel that it should have been proposed to endeavour to put these women under medical surveillance.

On the Contagious Diseases Act I offer no opinion. I had collected a number of papers on the subject. Some of the facts and statistics contained therein I know, from experience of my own in different places, to be so erroneous, that I could not help doubting the trustworthiness of other statements, many of them coming from distant places, and used by writers who had no practical experience of their own to aid them. The working of the Act is now being examined by a Parliamentary Commission, and most men will be disposed to await the publication of their Report. Hence it will be better to wait till next year in order to gather the results, should they tend to help the progress of medicine.

Dr. Letheby has observed that in a lucifer match manufactory at Stafford the workmen were saved from necrosis of the jaw, following upon exposure to the vapour of phosphorus, by carrying round their necks a small open vessel containing essence of turpentine, the fumes of which they thus inhaled. Apparently the cause of death in poisoning by phosphorus is the rapid withdrawal of the oxygen from the hæmatosin of the blood, but turpentine is known, like other hydro-carbons, to deprive phosphorus of its property of burning at low temperatures, at least, it prevents it from becoming luminous in the dark, and emitting vapour. When absorbed into the body the essence of turpentine seems to prevent phosphorus from burning in the blood, and thus from depriving the blood of the oxygen necessary to life. This is confirmed by the experiments of M. Personne with pyrogallic acid, a substance which, like phosphorus, has the property of absorbing oxygen. When administered to dogs it produced asphyxia and other symptoms similar to those observed after the administration of phosphorus. On this point, see the "British and Foreign Medical Chirurgical Review" for April, 1870, and "Pharmaceutical Journal," December, 1869.

Diagnosis.

Report by Balthazar W. Foster, M.D., *Professor of the Principles and Practice of Physic, Queen's College, Physician to the General Hospital, Birmingham; etc.*

Hemi-paraplegia.—Dr. Brown-Sequard,* after recording several typical cases of this disease, thus sums up the characteristics of the affection when complete—

(a) *On the side of the lesion in the spinal cord:*
- 1st. Paralysis of voluntary movement.
- 2nd. Loss of the muscular sense.
- 3rd. Hyperæsthesia to touch, to pain, to tickling, and to heat and cold.
- 4th. Perfect knowledge of the place on which an impression is made.
- 5th. Vaso-motor paralysis and elevation of temperature.
- 6th. Existence of anæsthesia in some parts, or in a small zone, between the upper limit of hyperæsthesia, and the healthy parts of the body.

(b) *On the side opposite to that of lesion*:
- 1st. Conservation of voluntary movement, and of the muscular sense.
- 2nd. Anæsthesia to touch, tickling, pain, and heat and cold.

Diphtheritic Paralysis.—The *Paralysis* which occurs after Diphtheria, although generally presenting well marked features, may occasionally resemble more or less closely other nervous affections. Thus, Dr. Grainger Stewart relates two cases of diphtheritic paralysis simulating locomotor ataxia.† As a rule, the history of the throat affection will aid the diagnosis, and justify the more hopeful prognosis, but when this history is wanting or inconclusive, Dr. Stewart points out that we may rely upon the following evidence as indicating the diphtheritic character of the paralysis. 1. Throat paralysis, indicated by nasal voice and dysphagia, especially of fluids. 2. Dilated pupils and paralysis of accommodation. 3. The sudden invasion of the ataxic symptoms. 4. The gradual super-addition of paralysis of cutaneous sensibility and of motion; and, Lastly, the absence of the ordinary prodromata of ataxia.

Locomotor Ataxy is often associated with diseased conditions of the joints, which Dr. Ball‡ points out may easily be confounded with

* "Lancet," December 25th, 1869.

† "Edinburgh Medical Journal," May, 1870.

‡ "Medical Times and Gazette," October 23, 1869.

other distinct affections. It is not uncommon in ataxic patients to meet with sudden tumefaction of the joints, followed by hydarthrosis, very suggestive of rheumatism, but which is to be distinguished therefrom by the absence (15 times in 18) of redness, of fever, and of pain. The pulse, although frequent in some cases, is not associated with any elevation of temperature; and the affection also differs from rheumatism in being localised to one or two joints at the most. The enormous deformity of the diseased joints at an advanced period, may easily suggest the idea of white swelling, especially if from long confinement to bed the ataxy is not remarked. In such a case the history would aid the diagnosis, and when the knee is affected, the opposite joint may show commencing hydarthrosis, and thus point to the spinal origin of the arthropathy. Occurring in the shoulder, this complication of ataxy may be mistaken for an old dislocation unreduced; but instead of the head of the humerus beneath the skin, there is to be found the extremity of the bone more or less atrophied.

On the Ophthalmoscopic Signs of Spinal Disease.—Among the many means which modern science has placed at our disposal for investigating the features of disease, the ophthalmoscope promises to play an important part. The observations of many observers, both on the continent and in this country, have shewn that its use in diagnosis is important. Dr. Clifford Allbutt,* in speaking of its use in spinal disease, considers that changes at the back of the eye may not unfrequently be observed, but remarks that these changes are more common in chronic than in acute affections of the cord. In cases following injury, the locality influences the time of their appearance. The optic changes are discoverable earlier, the higher the seat of injury. The changes symptomatic of spinal diseases are of two kinds, viz., simple or primary atrophy of the optic nerve, sometimes accompanied at first by slight hyperæmia and inactive proliferation (chronic neuritis). This never occurs as the result of injury, but is to be met with in chronic degeneration of the cord and locomotor ataxy: and secondly, hyperæmia of the veins, the retinal arteries becoming indistinguishable, the disc reddened, and its borders lost, the redness commences with increased fine vascularity at the inner border, and thence invades the white centre and the rest, so that the disc is obscured.

Diagnostic Uses of Electricity.—In his lectures on the clinical uses

* "Lancet," January 15, 1870.

of electricity, Dr. Russell Reynolds says,* the most general principle to be laid down in regard to electric irritability as a means of diagnosis, is—that when a muscle is separated from the influence of the cord by destruction of its nerve, or by destructive disease of the cord at the origin of its nerve, it loses its electric irritability, it loses it quickly, and it loses it to all forms of electric irritation.

(*a.*) In brain disease, *per se*, there is no diminution in the contractility of the paralysed muscle to the electric current.

(*b.*) In spinal disease so situated that it does not destroy or damage certain nerve-fibres which come off below the seat of lesion, and pass to certain muscles which may be paralysed, there is no necessary interference with electric irritability.

(*c.*) Spinal cord disease, which damages a part of the cord, diminishes the electric irritability of the muscles supplied by nerves coming from that portion.

(*d.*) Section of a nerve which simply cuts the muscle off from the spinal cord, produces a similar result.

In railway cases, electricity may be applied to test the genuineness of certain symptoms. A well marked difference in the irritability of the muscles on different sides of the body, justifies the inference that the symptoms are not feigned.

When the contractility of a paralysed muscle is normal, neither its nerve nor the part of the spinal cord from which the nerve comes is damaged. When the contractility is increased, the same conditions exist, plus an increased irritability of the cord or brain, most probably due to hyperæmia of the nervous centres.

When the electric contractility is diminished, if the disease be purely cerebral, several applications of electricity will restore the contractility, but not influence the paralysis. When the contractility is not restored, the disease has extended to the cord.

In some cases the diminished contractility is due to true "spinal paralysis," and while a few applications of electricity effect no change, months of treatment may be rewarded by improvement or cure. In such cases there is only impaired nutrition, and not disorganisation of the cord. Electricity, therefore, tells how much of the paralysis is due to disuse, and differentiates impaired nutrition from actual disorganisation of the spinal cord. In some cases the paralysis is due partly to disease affecting a nerve, and partly to disuse; the amount of contractility is in direct ratio to the nerve lesion, and a few applications show how much of the paralysis is due to disuse, and consequently how much improvement may be hoped for.

* "Lancet," vol. i., 1870.

In facial paralysis from cold, in lead paralysis, in paralysis of limbs from cold, and in some anomalous cases of atrophic paralysis of limbs, the loss of electric irritability is irregular, and may be of use in diagnosis. The curious condition may be noticed, that the irritability to a slowly interrupted galvanic current is sometimes distinctly increased, and is greater than in a healthy limb, while with a rapidly interrupted current it is much less than normal, and to a faradisation machine the irritability is completely extinct.

Rheumatic Fever and Pyæmia occasionally simulate one another most closely, and in some cases, as Dr. Sutton argues,* the differential diagnosis is exceedingly difficult if not impossible. Two cases are related, illustrating this difficulty of diagnosis, and in one given at length, the only point which excited any suspicion as to the non-rheumatic character of the case, was the unusual rapidity of the pulse as compared with the amount of joint affection, the pyrexia, and the absence of internal complications. Dr. Sutton thinks that this peculiarity may in future be of great use in the differential diagnosis; in his case there was no other feature to excite a suspicion of pyæmia.

Aneurism of Thoracic Aorta.—In describing a case of aneurism of the descending thoracic aorta which opened into the œsophagus and left bronchus, Dr. Hayden† said, that the history of the case shewed an exception to a well established diagnostic law. The total absence of vocal vibration and of crepitus in any degree, had been considered quite incompatible with the diagnosis of simple pneumonic consolidation of the lung. Henceforth there must be admitted one exception,—when from the hepatized lung air is excluded by the occlusion of the corresponding bronchus, from pressure of an aneurism.

Abdominal Aneurism.—In a paper, recording two cases of aneurism of the abdominal aorta, Dr. W. Moore,‡ after referring to the diagnostic value of eccentric and expansile pulsation, expresses his opinion that "persistency and equability" are the most characteristic features of abdominal pulsation. A pulsation present in the supine posture, he adds, if due to a tumour, disappears, unless the tumour is adherent to the vessels, when the patient is on

* "Medical Times and Gazette," September 18, 1869.

† "Dublin Quarterly Journal of Medical Science," August, 1869.

‡ Ibid.

the hands and knees. Among the stethoscopic signs, *a localised bruit along the course of the spine* he considers the most valuable. A murmur, simulating an aneurismal bruit, and produced by pressure, is audible in the supine, but disappears in the prone position; whereas an aneurismal murmur is heard in both positions along the spine. The localisation differentiates the murmur of aneurism from the murmur of aortic obstructive disease, which is occasionally propagated as low as the lumbar region, but is also continuously audible from the base of the heart. Hæmic murmurs are also marked by continuity in opposition to localisation. From the history of one of the cases, in which the chief symptoms were all thoracic, Dr. Moore infers that abdominal aneurism, by pressure on the solar plexus, may produce aphonia, dyspnœa, and dysphagia.

Pulsating Tumours of the Neck.—Dr. Cockle, in a paper entitled "Further Notes on Pulsating Tumours of the Neck," * points out that the cases described are only likely to be confounded with either advanced senile degeneration of the ascending aorta, and its arch, or aneurism of this vessel, and its larger branches. The first condition occurs only in old age, when the aorta affected with atheroma and calcification dilates locally or generally under the blood pressure. The bony arch of the aorta can now and then be felt in the episternal notch; there is marked collapse of the vessels of the neck, and often a harsh murmur over the aorta. The arteries all over the body are converted into more or less rigid tubes, and the sphygmograph tells of their loss of elasticity by the blunt-headed trace, and the absence of the dicrotism. In pulsating tumours of the neck, on the other hand, the impulse is isolated from the pulsation of the arch, the tumour is limited to the innominate artery; there is no harsh murmur over the aorta, no collapse of the vessels (until a later period), and no marked signs of general arterial change. The dilatation of the aorta is a primary condition, the *soft*-blowing murmur present is at first limited to the upper part of the aorta, and the sigmoid valves accurately close. Later in the history of these cases the dilatation increases, the sigmoid valves become incompetent, the vessels show collapse, and the heart hypertrophies. From ordinary aneurism of the aorta and its branches, pulsating tumours of the neck are to be distinguished by the following features:—by the intermitting character of the tumour, very expansive, tense, and liquid during

* "Lancet," January 1st and 8th, 1870.

arterial diastole, with perfect collapse during arterial systole, this collapse indicating the absence of clot; by the generally unchanged condition of the carotid and radial pulses (if any change occur, the right radial is found to be stronger than the left); by the absence of any effect on the tumour being produced by pressure on carotid and subclavian arteries; by absence of pressure-signs of importance; by the apparently indefinite duration of the affection, and its slight variations; by the constant coexistence of dilatation of aorta, leading to insufficiency of aortic valves; by the different treatment required; and, lastly, by its exclusive occurrence in females between forty and fifty years of age.

Aneurism of the Aorta.—The Croonian Lectures at the Royal College of Physicians were delivered this year by Dr. Sibson.* The subject chosen was aneurism, and the lectures were in great part devoted to the exposition of the symptoms of the malady. In no condition is there a greater variety of symptoms than in aneurism, and oftentimes there is no more difficult task than that of persuading a strong man, who feels little or no inconvenience from this grave disease, that he is the victim of one of the most serious, and most deadly of human ills. Symptoms the most violent, and apparently perfect health being alike consistent with internal aneurism, the diagnosis is often a matter of the greatest nicety, and the very diversity of the symptoms, when clearly elucidated, is itself the guide to the greatest precision in determining the locality and character of the disease. Dr. Sibson first considered tubular aneurism of the ascending portion of the arch, with dilatation of the aorta from its origin and incompetency of the aortic valves. Some of the cases exhibited a peculiar symptom, which was perfectly well marked in one case, as follows:—the breathing would for a short time become difficult, then gradually become shallower and shallower till it ceased, and the patient fell asleep. In about thirty seconds the breathing would recommence, with respirations at first slow, then deep, and finally laboured as at the beginning. The whole cycle lasted about ninety seconds, and was then renewed with remarkable regularity. This continued for eight days, and then disappeared on the occurrence of hæmoptysis and pulmonary apoplexy. An important sign of aneurism of the ascending part of the aorta is the fact that the tumour strikes the chest wall at the second right intercostal space. In other aneurisms the point of visible pulsation may begin elsewhere, and afterwards

* *Vide* "Lancet," March 26th, April 2nd and 9th, 1870.

descend to this point; but in aneurism of ascending aorta the pulsation *begins* in this second right intercostal space, and, if it moves, travels downwards.

Intra-thoracic tumours are occasionally very difficult to diagnose from aneurism of the ascending part of arch. The chief guiding points are:—the absence of a tumour from the right intercostal spaces; the evidence of other tumours elsewhere; the presence of varicose veins on the surface of chest and abdomen, a condition never met with in aneurism; the absence of a disproportion between the first and second sounds of the heart; the absence of enlargement and prominence of the arteries of neck; and the absence of signs of arterial disease elsewhere.

Sacculated aneurisms of the ascending part of the arch Dr. Sibson has found to constitute fully half of the cases of aortic aneurism. These have two sites of selection: the right convex wall, midway between the orifice of the aorta, and the innominate; and the angle of junction between the ascending and transverse portions of the arch. The sac may produce no symptoms; the patients, in a few cases, dying suddenly, while in apparently good health, from hæmorrhage into the pericardium. In half the cases there is difficulty of breathing, in one-third cough, and in about one-third pain in chest, symptoms due most probably to pressure on the pneumogastric and sympathetic nerves. The aneurism points in second intercostal space. Hoarseness, aphonia, stridulous and laryngeal breathing, and dysphagia are absent; bronchitic symptoms are often the only ones that arrest attention. Two-fifths of the cases of sacculated aneurisms exist close to the origin of the innominate, and advance towards the upper piece of the sternum, and, eroding the bone, grow upwards and sideways, inclining more to the right than the left. They tend to displace both the transverse and ascending portions of the arch, and press directly on the trachea, and indirectly on the œsophagus and left recurrent laryngeal nerve. Pain is often present at the top of the sternum; the breathing may be tracheal, and voice affected. The indirect pressure may produce dysphagia. In consequence of the oblique position of the transverse portion of the arch, aneurisms of the anterior wall project towards the left, and those of the posterior wall towards the right; the former encroach upon the left lung, stretching the adjoining nerves; the latter press upon the larynx, œsophagus and recurrent laryngeal. Thus, according to the side of the vessel affected, the train of effects will be different. The tendency is, as a rule, to the left, just as aneurism of the ascending part is to the right. Very small aneurisms, situated posteriorly,

may produce most alarming symptoms by pressing on the trachea. Dyspnœa, in many cases, is constant, and increases in paroxysms, and may destroy life. The voice is remarkable, ringing, or squeaking, or ventriloquial, or lost. Cough of the same character as voice, and has no catch in it. Pain is less frequent, and less lancinating than in cases of aneurism of ascending or descending aorta. Dysphagia is scarcely less constant than dyspnœa.

In innominate aneurisms the situation of the tumour behind the right sterno-clavicular articulation affords the best distinction from aneurism of the ascending aorta close to the innominate. The sac enlarges both upwards and downwards into the chest. The trachea and œsophagus are pressed upon. The carotid and subclavian arteries are obstructed more or less, either by direct pressure, or by plugging up by fibrin. The subclavian, indeed, is narrowed or obstructed in $\frac{9}{10}$ths of the cases, while the right carotid is affected in one half. Dyspnœa is a frequent symptom, but the severity is less than in aneurisms of transverse portions of arch. Cough is present, and pain down the right arm and other symptoms, from pressure on the tracheal plexus.

Aneurisms of the descending portion of the arch, as they develop, force the whole arch upwards, and there may be distinct pulsation over the manubrium.

In addition to pressing on the œsophagus, recurrent laryngeal and trachea, like aneurisms of the transverse portion, these aneurisms also implicate the left bronchus. When springing from the posterior wall of the vessel, as it does in half the cases, the aneurism erodes the bodies of the vertebræ, presses on the great splanchnic nerve, giving rise to epigastric pain and dysphagia, referred to lower end of œsophagus. Dyspepsia of a very uncontrollable and painful kind is one of the earliest symptoms. Dysphagia may arise from direct pressure; pain is often present in tumour, but is not a trustworthy symptom. When the aneurism points externally it invariably does so at the first rib, and travels down to the second space. There is more or less dulness on percussion, and bronchial breathing over the left scapula, and very uniformly, in Dr. Sibson's experience, increased vocal fremitus. The group of symptoms is completed by husky voice, laryngeal respiration, a very faint murmur, exaggerated heart sounds, and enfeebled breathing over left lung. In aneurisms below the arch the symptoms depend upon the position. The varying presence of the murmur is caused by the state of the sac. When loose, the murmur is present; when tight, absent. Some experiments of Dr. Sibson confirm this explanation which was first offered by Sir D. Corrigan in "Lancet" for 1829.

*Pain at the heart and in its neighbourhood.**—Heart-pain, whether in the form of the agony of angina pectoris, or the trifling uneasiness produced by some forms of indigestion, is always an important symptom. There is, probably, no localised pain which alarms a patient so much, and which, in so many cases, tends to aid its own development, by the brooding apprehension which it excites. Dr. Dobell has commenced a record of his experience of heart pains, and specially dwelt on the diagnosis between the true cardiac pains and those depending on indigestion. The pain in the region of the heart depending on dyspepsia is very common, and may generally be referred to one of the following heads:—1. A dyspepsia which, in the large majority of cases, is characterised by an excess of acidity, and has been long neglected or aggravated by mistaken treatment. 2. An erratic neuralgia, taking its start from the stomach. 3. An impression on the vaso-motor system of nerves, producing a local interference with circulation. 4. Deteriorated blood, consequent upon the dyspepsia, and other causes, and the effects of this upon nutrition, especially of the nerves of the heart.

Dr. Dobell insists on the similarity of this pain of dyspepsia to that produced by organic disease, and points out that as they are often conjoined, there is great danger of mistaking the relief afforded by removing the dyspepsia for a cure of the organic affection. The great relief which follows the treatment of the dyspepsia of cardiac diseases makes it an important point to diagnose this form of indigestion, and remove this difficulty from the heart. The prognosis in these cases must be made with great caution. The pain in severe cases may extend to the right arm. Rest from exercise relieves the pain. The pain at the heart and in the left arm, due only to dyspepsia, is soon cured by appropriate remedies, whereas that due to organic disease persists after all dyspeptic symptoms have disappeared. The diagnosis may be made without waiting for the effect of treatment, by the fact that if the pain is only excited by exercise taken with a full stomach, and only comes on after eating, it may still be due to dyspepsia only.

Dr. Dobell has formularised some of the results of his experience in a series of aphorisms, of which the following especially relate to diagnosis:—

1. Pain in the region of the heart, and down the left arm, does not necessarily indicate heart-disease.

* "Medical Press and Circular," vol. ii., 1869, and vol. i., 1870.

2. The conjunction of pain in the region of the heart, and pain in the left arm, may be a most important symptom of heart-disease, and is never to be disregarded.

3. If pain is excited by exercise taken when the stomach is not distended with food or gas, and especially if it comes on quickly, and increases steadily in severity with the continuance of exercise, it is almost certain that there is some serious disease of the circulatory organs.

4. When it is found that flatulence, or a full meal embarrasses the heart painfully, a careful investigation should be made into the condition, both of the organ itself and of the blood.

5. Important heart-disease may exist, and yet pain at the heart and in its neighbourhood be absent.

Adenoid vegetations in the naso-pharyngeal cavity constitute, according to Dr. Wilhelm Meyer, of Copenhagen,* a new and troublesome disease, not at all uncommon in Denmark. The vegetations, when at all largely developed, impair the power of pronouncing nasal consonants, and give a "dead" character to the speech. The nasal respiration is impeded, and consequently the mouth is kept open, and the face acquires a vacant expression. Deafness is a common symptom, and the nostrils are compressed. The vegetations are very liable to bleed. Digital examination affords the best means of detecting these adenoid vegetations, and is more trustworthy than rhinoscopy, which is, however, sometimes requisite. In the discussion which followed the reading of Dr. Meyer's paper, at the Medical and Chirurgical Society, the opinion was generally expressed that the condition described was due probably to enlargement of the ordinary follicles of the naso-pharyngeal mucous membrane.

Bronchitic Asthma.—Dr. Hyde Salter, in a clinical lecture,† after defining asthma as paroxysmal dyspnœa, attended by sibilation, points out that the circumstances which distinguish bronchitic asthma are, its occurrence as a winter asthma, its production by the causes of catarrh, and the presence of purulent expectoration. The supervention of an asthmatic attack every night, caused most probably by the accumulation of mucus, is also in favour of the diagnosis of the bronchitic form. All other forms of asthma are aggravated by the hot, oppressive, thundery weather of late summers, while bronchitic asthma is worse in winter. To this

* "Lancet," December 4th, 1869. † Ibid., January 29th, 1870.

rule Dr. Salter has met some exceptions in which bronchitic asthma occurred in summer. The signs of bronchitis may be present, but their absence does not justify the exclusion of the diagnosis of bronchitic asthma.

The Thermometer in Diagnosis.—The thermometer is now a recognised instrument of clinical research, and is almost as constant a companion to the physician as the stethescope. The Germans must be awarded the credit of having given to its use that value which it now possesses, and it is to their industry that we owe the chief rules which enable us to draw safe conclusions as to diagnosis and prognosis from the surface temperature of a patient. In this country many workers have tested the conclusions of the continental observers, and added to them and corrected them. Dr. Edward Long Fox, of Clifton, has especially been engaged in this work for several years, and has published his conclusions in a series of papers,* from which we quote the principal points of interest from a diagnostic point of view:—

Measles.—The mode and period of defervescence serve to distinguish this disease from typhus, whilst the distinction by the eruption alone is not always absolutely easy. On the 6th day the pulse and temperature both fall in measles, whilst in typhus at the same period both are rising.

Rubeola Notha.—In this disease the temperature reaches its acme on the 2nd evening, and on the 3rd day defervescence begins. The fall is from evening to morning, with slight evening rise; the normal temperature line is reached in about 3 days. This mode of defervescence, together with the shorter duration of the pyrexia, the absence of coryza, the slighter tendency to thoracic complications, are sufficient to distinguish this condition from measles.

Cerebro-spinal Meningitis has three distinguishing phenomena as to temperature, viz.: 1. the great irregularity; 2, the maximum point being generally below that of typhus, enteric fever, relapsing fever, or scarlatina; and, 3, the irregular relation of the temperature to the pulse, which is often slowest during the pyrexial periods. The greatest difficulty occurs in diagnosing this disease from acute tuberculosis; in the latter, however, the remissions of temperature do not correspond so generally with the relief of symptoms.

Tubercular Meningitis has not so high a temperature as non-tubercular meningitis, and is often below the high temperature of tuberculosis. It is not common to meet with a temperature much

* "Medical Times and Gazette," vol. i., 1870.

above 103°, and the range is most commonly between 100° and 101°. The high temperature of acute tubercle seems to be decidedly lowered when the disease has affected the pia mater and the base of the brain.

Abscess of the Brain.—The thermometer distinguishes this condition from syphilitic or other cerebral tumours in which pain is present, but there is no elevation of temperature. The persistence of a high temperature will serve to diagnose cerebral abscess from every other form of mental alienation; whilst the greater elevation of temperature, 105° and upwards, will generally suffice to separate abscess from tubercular meningitis.

Mania.—Except in phthisical mania, in which the temperature is very high, seldom below 104°, the temperature in mania is not removed from the normal. In periods of quiescence the temperature is below that of health, and before maniacal attacks there is often a considerable fall. During excitement it may rise 1 or 2 degrees Fahr.

Melancholia has a temperature below the normal, and dementia still more so. In the latter case the loss of body-heat is in direct ratio to the extent of the dementia.

Bronchitis.—The comparatively low temperature in bronchitis is useful, in distinguishing it from pneumonia, not always an easy task. It is also of some help in those cases of enteric fever in which the symptoms during the first week are mainly pulmonary; if the temperature becomes high at the middle or end of the first week, the disease is more than bronchitis. It is useful also in connection with tubercle. The physical signs of tubercle are often masked by bronchitic râles. If the temperature exceeds 102°, and especially if it keeps up while the bronchial irritation manifestly declines, we may be pretty sure the patient is tuberculous.

Febricula.—In simple continued fever the elevation is much higher during the first two days than in enteric fever, and it often reaches 103° on the second morning. A rapid ascent, a brief stationary period, and a gradual subsidence, the whole being over in ten days, are the characteristics of this malady.

Typhus differs from enteric fever in the rapid rise in ascending period; 104° or 105° may be reached the first evening. This rapid rise continues to fourth day; the acme which is reached on seventh or eighth day is not often above 105°. The stationary period varies in duration according to the severity of the attack, and the defervescence is sometimes sudden on the 13th day, or at others may be gradual, beginning between 13th and 17th days.

Enteric Fever.—There are some useful rules for diagnosis of this

fever:—1. A temperature very near 104° on second day is not enteric fever. 2. A temperature, which after evening of fourth day is not above 102½°, is not enteric fever. 3. A patient, whose temperature has after the first day been normal once in the first week, has not enteric fever. The thermometer is useful in the diagnosis of enteric fever in that the mode of ascent, the line of ascending oscillations, distinguishes it from other diseases with which it might be confounded. In pneumonia the ascent is much more sudden. In ague the temperature is normal for a part of the day. In febrile gastro-intestinal catarrh the height of the temperature on the second day may be above that of enteric fever and so exclude it, and at any rate the remissions will be more considerable. In acute tubercle the oscillations are as irregular as in enteric fever they are regular. There is no fixed point as to the maximum of temperature; the morning remissions are always more considerable than in enteric fever; the stage of decrease in the stationary period and the period of decline are wanting.

Relapsing Fever.—The thermometric phenomena serve to distinguish this malady from all others. A rapid though not quite sudden ascent, an absence of any distinct stationary period, a sudden critical defervescence, a normal temperature, or even one somewhat lower than normal, for an interval extending over a variable number of days, and then a repetition, more or less intense, of the pyrexia, with a similar subsidence, are the main characters of relapsing fever. The ascending period of first pyrexia occupies four or five days. Morning remissions are absent, or very slight. The temperature will rise to 106°, or even 108°, and the highest point will often just precede the critical defervescence, which has so rapid a fall sometimes as 10° or 12° in a few hours. The relapse may be after a day's interval, or after fourteen or seventeen days, or more commonly perhaps about nine days.

Epidemic Roseola.—Some years ago Dr. Babington called attention to an eruptive disease, to which he gave the name of rubeola notha. During the past year this exanthem has been prevalent, and Dr. Squire* gives the result of his observations of it, and suggests that, although rubeola is the proper name for it, while morbilli should be used to designate measles, the most convenient appellation at present is epidemic roseola. It is contagious, and the eruption is not usually distributed in separate small patches.

* "British Medical Journal," January 29th, 1870.

Parts of the skin are successively affected with discrete rose-red spots, not generally aggregated in the manner peculiar to measles; and though the skin is more or less turgid, the separate bright red spots are sufficiently prominent. Eight or ten days is the period of incubation, but the great distinguishing character is that the eruption appears on the first day of the illness. The throat is slightly affected, and may remain so for several days; there is also generally some redness of the conjunctiva. The appetite is not impaired, and there is oftentimes little constitutional disturbance. There is no subsequent catarrh, and pulmonary complications are not met with. The temperature is highest on the first day, coinciding with the appearance of the rash. Only once has Dr. Squire found it to exceed 102° Fahr. On the second day it is about 100°, and it falls gradually, till by the fifth day the subsidence is complete.

New Test for Albumen.—Dr. Meymott Tidy proposes* a new test for albumen in the urine, as much more delicate than nitric acid. (For details see "Report on Chemistry."—Ed.)

Dr. Waller G. Smith, of Dublin, has pointed out † that this test for albumen was first proposed by M. Méhu, in the "Journal de Pharmacie et de Chimie," February, 1869.

Suppression of Urine.—Dr. W. Roberts, of Manchester, in relating a case of suppression of urine from obstruction of the ureter by a calculus, ‡ enumerates the following deductions of diagnostic value respecting suppression caused by mechanical obstruction. This form generally occurs in persons who have only one kidney:—1. In suppression from mechanical obstruction if any urine escape past the obstacle—and nearly always *some* urine does escape—it is so markedly dilute that this character furnishes an important diagnostic sign. 2. When the obstruction is in the ureter, only a very small quantity of urine (2 to 3 drachms) accumulates above the obstruction; and no dilatation of the ureter and pelvis of kidney takes place. Dilatation only occurs when the obstruction has been partial and of long standing. 3. If the suppression continue, the temperature of the body falls, goes on progressively falling until death. 4. The essential symptoms of suppression of urine (pure anuria) are very different from those generally attributed to "uræmic poisoning;" and consist mainly of insomnia and a progressive declension of the power of the voluntary muscles

* "Lancet," May 14th, 1870. † Ibid., May 21st, 1870.
‡ Ibid., June 18th, 1870.

These were the chief symptoms in the case recorded by Dr. Roberts. The other facts in the history were slight febrile movement and disturbance of the stomach lasting 4 days after impaction of stone; pulse almost stationary, 72 on third day, 80 on tenth; fall in the frequency of respiration; laboured breathing increasing towards the end from progressive weakening of the inspiratory muscles; steady fall of temperature: slight muscular twitches, no convulsion or coma, and intellect clear to the last: pupils contracted on ninth day, and on same day dryness of mouth and tongue became marked, and patient died early on tenth day from the date of the suppression.

Parametric Abscess is considered by some authors to be never moveable, but Nonat holds the opposite view. Dr. Matthews Duncan, however, shows* that the mobility while it may occasionally occur is by no means as common as the French author supposed. This rare mobility is an important fact, which has not been generally recognised by English gynæcologists. It has a very important bearing on the diagnosis of parametric abscess from perimetric indurations and perimetric collections of serum and pus, which, while sometimes moveable by displacement, are never freely mobile. In the case related by Dr. Matthew Duncan, the abscess was moveable upwards and downwards during its maturation. After it had spontaneously evacuated its contents per vaginam, and consequently become much reduced in size, its mobility was increased. The hand examining externally above the left pubic horizontal ramus, could easily feel the hard lump, but could not discover its mobility. A combined external and vaginal examination made its free mobility evident. Seized thus between the fingers of the two hands, it could be moved easily upwards and downwards, like the healthy unimpregnated uterus or a large non-adherent ovary.

Pelvic Peritonitis and Pelvic Cellulitis.—These names Dr. Lauchlan Aitken thinks† far preferable to the perimetritis and parametritis of some authors, as being more simple, and showing at a glance the nature of the affection. The differential diagnosis of these conditions is no doubt very difficult, and although many authors have attempted to establish it according to fixed rules, there has not in Dr. Aitken's opinion been any attempt which is remarkable for its felicity. There is a considerable difficulty in separating the two affections; and while admitting this, Dr. Aitken feels that the

* "Edinburgh Medical Journal," July, 1869. † Ibid., April, 1870.

direction at least in which the attention must be turned when endeavouring to separate the two affections may be indicated. It is a grave error to rely upon the greater severity of the symptoms as indicative of pelvic peritonitis. The diagnosis must rest chiefly on the physical signs; and the difficulty is much increased by the fact that in many cases a combined external and internal manipulation cannot be obtained at first on account of the pain, except under chloroform. In by far the greater number of cases of pelvic cellulitis, internal examination tells us that the induration or swelling is on one or other side of the uterus, and it is only very rarely that the whole roof of the pelvis seems blocked up by the hard stony mass so common in pelvic peritonitis. In most cases of cellulitis the tumour is found principally in one or other iliac fossa, and apparently closely connected to the iliac bones, or to the pubes; while the tumour, if felt at all through the abdominal walls in peritonitis, is usually more in the mesial line, or if situated laterally, does not seem so intimately blended with the bones. With regard to the mobility of the uterus, it may be said to be absolute in many cases of peritonitis when the uterus is fixed all round, while in cellulitis the fixation is rarely if ever so complete.

In cellulitis, the uterus is usually pushed to the opposite side of the pelvis from that occupied by the phlegmon; whereas, in some cases of peritonitis, the body and fundus of the womb are so completely lost or enveloped amidst the exudation that it is only by the use of the sound when such use is justifiable, that we can determine its exact position in the pelvis. There can be no doubt, too, that flexions of the uterus of one kind or another—ante, retro, or lateral flexions, according to the position of the swelling—which are common in peritonitis, occur much more rarely in cellulitis. When the swelling has risen into the abdomen, we may be partially assisted in our diagnosis, not only by observing the position of the tumour, or by having followed its mode of origin and progress; but also by calling to our assistance such aids as percussion and auscultation. Portions of the intestine so frequently enter into the composition of the intra-peritoneal tumours, that we can often obtain from them a more or less modified tympanitic note, or hear the movements of gas or fluids through the mass. I know of only one form of cellulitis that could be confounded with an intra-peritoneal tumour under those circumstances, and that is the extension of the phlegmon to the abdominal cellular tissue, the external peritonitis of some authors. There is one point which every gynæcologist can corroborate, namely, the retraction of the thigh in cases in which the cellular tissue round the psoas and

iliacus muscles is involved, and the relief of pain which this flexion produces. I have frequently (says Dr. Aitken) noticed, in cases of pelvic peritonitis, that the flexed position of the thigh either did not ameliorate the pain, or did so only when both knees were raised, by removing the tension of the abdominal muscles.

MANAGEMENT AND TREATMENT OF DISEASE. *Report by* DAVID J. BRAKENRIDGE, M.D., F.R.C.P.E., *Extra Physician Royal Hospital for Sick Children, Physician New Town Dispensary, Edinburgh.*

Scurvy.—Some interesting observations on the treatment of scurvy, made in the Arctic Regions, by Mr. J. W. Tayler, F.R.G.S., F.G.S., have been reported by his brother, Dr. W. H. Tayler.*

In the years 1854-55, fourteen men were under his charge in working some mines at Evigtok, in Greenland. All excepting himself and the steward took scurvy. After exhausting the stock of lime-juice, citric acid, and everything likely to prove beneficial, Mr. Tayler remembered that sailors, when so circumstanced, get on shore and hunt for sorrel, and that under its use those affected with scurvy rapidly improve. It occurred to him that the binoxalate of potash might probably be the active curative agent contained in the plant. Having in his possession some oxalic acid and potash, he set to work to manufacture a compound of binoxalate of potash with excess of oxalic acid. This he gave to the men affected with scurvy in four grain doses three times daily. A rapid improvement followed, and the men, though continuing their previous diet, soon lost all symptoms of the scurvy. All were affected with it in its most virulent form, and yet all recovered, except one man, who died from exposure and fatigue while in an exhausted state.

These results have been fully borne out by Mr. Tayler's subsequent experience at Exeter Sound, and it was there abundantly shown that the ordinary treatment was not nearly so efficacious.

Mr. Tayler therefore confidently recommends the binoxalate of potash as a most valuable remedy in scurvy.

Rheumatic Fever.—The marked effects produced by the tincture of the perchloride of iron upon the course of such spreading inflammatory affections as erysipelas and diphtheroid sore throat,

* "Lancet," June 5, 1869.

induced Dr. J. Russell Reynolds* to try this medicine in cases of acute rheumatism.

Eight cases are recorded by him in which its administration was highly successful.

The following facts brought out by these cases are noteworthy:—

1. The relief of the joint affection has been definite, uniform, and speedy. In four cases it was relieved in one day; in three cases, in two days,; and in one case, in three days. The longest period of suffering after the commencement of the treatment was five days.

2. The temperature became normal between the second and seventh days after the commencement of the remedy. The mean duration of the pyrexia was—if we exclude one case with cerebral symptoms, and one case with intercurrent pneumonia—a little less than five and a half days.

3. The total duration of the pyrexia—viz., that existing from the outset of the symptoms to the permanent fall of temperature was—excluding the same cases as before—from seven to fifteen days. The mean duration was a little more than ten and a half days.

4. The duration of the disease varied according to the time at which the treatment was commenced. The iron was given in three cases on or before the fourth day of the disease, and the mean duration of the malady from first to last was eight days; in four cases the medicine was commenced on the sixth, seventh, and eighth days, and in three the mean of the total duration was rather above twelve days.

5. No symptom of discomfort was induced by the iron. There was no headache, the tongue cleaned, and the general feelings of the patient improved.

Typhoid Fever.—Nearly six years ago Dr. B. Kelly,† on physiological grounds, recommended belladonna in the treatment of enteric fever. Since that time, Dr. Kelly has had ample opportunity of testing its therapeutical value. His experience of its usefulness has been so satisfactory, that he regards its effects on the disease as equal to those of quinine on paludal fever, or chalybeates on anæmia.

"It completely changes," he says, "the whole character and outward manifestation of the disease. Delirium, coma, and sub-

* "British Medical Journal," December 18th, 1869, p. 649.

† "Medical Times and Gazette," February 5th, 1870.

sultus quickly vanish, and are succeeded by calmness and clearness of the intellect, by natural sleep, and by complete control of all the voluntary muscles. Diarrhœa is checked, and healthy consistent evacuations are established. The appetite, if excessive or deficient, is restored to something like a normal standard. The pulse, from being frequent, fluttering, and compressible, is rendered slow, strong, and equable. The morbid temperature of the body . . . . . falls to a natural level. The vital changes induced in the blood, glandular, and other organs, as shown by passive hæmorrhages, tenderness of the abdomen, hypostatic congestions, and ulcerations are all arrested in limine, and the deranged functions of the economy return to their original equilibrium, and are performed with the same regularity as in health. The patient, after an inconceivably short space of time—usually from twenty-four to forty-eight hours after the first administration of the remedy—wakes up, so to speak, and pronounces himself as well as ever; and, indeed, to look at him, he really appears so." He must, however, be kept in bed the usual time, otherwise serious consequences will ensue.

The dose which Dr. Kelly gives to a vigorous adult is from twenty to twenty-five drops of the officinal tincture of the British Pharmacopœia every four hours. This must be varied according to age and constitution.

This treatment is usually continued for not less than two weeks, and Dr. Kelly has never known anything more serious to attend its administration than moderate dilatation of the pupil and slight dryness of the fauces.

Belladonna acts by completely preventing the specific lesions in all the tissues and organs of the body naturally consequent upon the absorption of the typhic poison.

Typhus Fever.—Dr. James B. Russell, of Glasgow,* has employed the hydrate of chloral largely in the cerebral complications of typhus, and has found that, as a sedative and hypnotic, its action was remarkably uniform and rapid.

It appeared to have a more immediate and permanent curative action in the acute delirium which occurs at the acme of typhus, than in the *delirium tremens* of the second and third weeks, when the blood is loaded with the products of the fever, and there are general tremours and subsultus. In many cases of the active delirium in which the hydrate was employed, more or less refreshing sleep was obtained, and the patient afterwards became and continued sensible.

Although the adynamic form was less amenable to the chloral, yet even here excellent results were in many cases obtained.

* "Glasgow Medical Journal," February, 1870, p. 209.

"The general statistics of results in all cases are as follows:—Chloral was administered 32 times in the treatment of 21 cases. Of these 32 doses, 24 were followed by sound and well-marked sleep, lasting without interruption from one to five hours, and nearly always prolonged by a succeeding period of broken sleep and general tranquillity; three doses had a decidedly, four a partially, soothing effect, and one proved inert; but the last dose was immediately vomited, and ought not therefore to be counted." Not one of the 21 cases proved insensible to the action of the chloral when repeated.

Dr. Russell never met with any number of consecutive cases of delirium, &c., in which any other sedative shewed such uniformity of action, or even approximated to it. The great advantage which chloral possesses over other hypnotics, lies, he thinks, in the fact that the sleep which it produces is almost perfectly analogous to natural sleep, hence dangerous narcosis, pulmonary stasis, and other risks are avoided, when it is employed in properly adjusted doses.

Dr. Russell, at considerable length, contrasts the sleep and after effects produced by chloral, with those produced by opium, and gives a decided verdict in favour of the former. He also considers the hydrate of chloral more uniform and satisfactory in its action than the bromide of potassium.

The doses which he recommends as sufficient are 20 grains for an adult; 2 grains for an infant of eighteen months; and 10 grains for a child of from nine to fourteen years. An ounce of water sweetened with half an ounce of syrup was the vehicle in which it was administered, and he found that, if not sufficiently diluted, it was vomited.

During the year from June 1865 to June 1866, Dr. J. W. Miller* has administered the sulphites in 161 cases of typhus. There were admitted into the Dundee infirmary during that period 884 cases of typhus altogether. Sulphite of soda was employed in most of these 161 cases, and latterly sulphite of magnesia. The quantity administered daily varied from 60 to 240 grains. Under this treatment there was a mortality of 1 in 10; in the cases treated by other means the mortality was 1 in 10·3. The results were therefore quite negative.

Dr. Miller has, however, found the hyposulphites very useful in cases of septicæmia or purulent infection.

In such cases, to have any effect, the remedy must be given in

* "Edinburgh Medical Journal," September, 1869, p. 210.

considerable doses—from ʒss to ʒi every fourth or sixth hour, and the treatment must be commenced early.

Dr. W. Jackson Cummins* has almost entirely given up the use of the bisulphites as prophylactics in the zymotic diseases. He now employs sulphurous acid fumes, produced by burning sulphur in the sick room. In the cases under his observation, he found that by this means, not only was the severity of the disease lessened, but also that its spread was checked, other members of the households which adopted it enjoying a comparative immunity.

Cholera.—The following case of cholera, which Dr. W. Bates † treated successfully by means of the hypodermic injection of morphia, is given in his own words:—

"I saw the case for the first time at 11 o'clock a.m. The first symptoms had commenced seven hours previously by vomiting and purging. When I saw her she was in the *algide stage*—rice water evacuations from the stomach and bowels, no pulse perceptible at the wrist, voice husky, and the skin had a contracted and pinched appearance throughout its whole extent: skin cold, and expired air cold; thought she must die every minute.

"Whatever the poison of cholera may be, a mycoderm or otherwise, such poison produces 'tonic' spasm of the involuntary, and 'clonic' spasm of the voluntary, muscular tissues. For this spasmodic condition I have employed the hypodermic administration of morphia.

"In my case on Thursday, I introduced four minims of Roberts' solution of morphia over the stomach, and returned to see the effect in an hour afterwards, when I found the abdomen warm which had been previously cold. I then introduced four more drops, and left the case for three hours, when I found it much improved—spasm of the involuntary muscles much less, countenance much improved, body warm, pulse quite perceptible at the wrist; vomited once only in four hours; still purged; stomach had begun to retain fluids. At eight p.m. reaction had fully taken place, and the case has since been treated for one of ordinary diarrhœa."

Delirium Tremens.—Chloral promises to be a most valuable remedy in delirium tremens. A case is recorded by Mr. Henry Chapman,‡ in which it produced sleep after morphia, which was successful in previous attacks, had signally failed. At 12 o'clock p.m., five hours after the last ineffectual dose of the morphia, 30 grains of the hydrate of chloral in sweetened water was given. In five minutes he was asleep and quiet for half an hour, when he

* "Dublin Quarterly Journal," August, 1869, p. 221.

† "Lancet," August 21, 1869, p. 282.

‡ "Medical Times and Gazette," October 2, 1869, p. 419.

awoke composed and rational. Some brandy and water, and a second dose of twenty grains of the hydrate was then given, and he fell into a deep sleep which lasted until 8 a.m.

Mr. J. H. Barnes* has since published 10 cases, treated by him at the Liverpool Workhouse Hospital, in which the hydrate of chloral was employed. From the results which he obtained in these cases, he thinks it is evident that the action of chloral varies considerably according to the constitution of the patient.

In one of his cases 30 grains produced a quiet night's sleep in a most excited and sleepless patient; in another, 70 grains produced no effect; and in another, 90 grains procured a sleep of only two hours' duration. In all the cases in which it was effectual, sleep was procured in from fifteen minutes to two hours. In none of the cases was there that perfect composure and firmness of muscle noticeable after the sleep produced by half ounce doses of the tincture of digitalis. Slight congestion of the eye and face, and slight perspiration were observed in most cases; while no disturbance which could be attributed to the drug was produced. Mr. Barnes considers 60 grains the minimum dose for the purpose of producing sleep in delirium tremens.

Insanity.—Dr. John B. Tuke,† Medical Superintendent of the Fife and Kinross Lunatic Asylum, has made a limited series of experiments on the influence of the hydrate of chloral on certain patients recently admitted, and also on some old standing chronic cases.

The recent cases were:—first, one of chronic alcoholism; second, and third, two cases of asthenic insanity; and fourth, a case of climateric insanity characterised by melancholy.

The experiments were conducted very carefully. First of all the patients were placed under special observation for three days previous to the administration of the chloral; accurate notes were taken of the temperature, pulse, respiration, and general condition twice a day; and also the state of the urine as to quantity and quality. For the next four days ʒss doses of chloral hydrate were administered at 10 a.m. and 9 p.m., and observations were taken at 11 a.m., 2.30 p.m., and 10 p.m., so as to enable Dr. Tuke to judge of its immediate effects, and the state of the patients during the interval. On the next three days none of the medicine was given, observations being still continued. Then, for four days more, half-drachm (in one case scruple) doses were given as before, morning and evening.

* "Lancet," November 27, 1869, p. 741. † Ibid., March 26th, 1870.

Subsequently half-drachm doses were administered at night for a few nights, and then discontinued.

The four cases are given in detail, and the result in each case was more or less favourable. He has used chloral also in those chronic cases of insanity in which violent outbursts of excitement occur, and invariably with good results.

Dr. Tuke considers that chloral possesses the following advantages over other hypnotics:—

1. It is more uniformly certain in its action.
2. It has no depressing influence.
3. It does not cause constipation.
4. It does not produce nausea.
5. Its effects are more lasting.

Dr. George Crawford* also bears testimony to the efficacy of chloral in a case of insanity. The patient, a woman, aged 56, had, on two former occasions, been confined in an asylum; fourteen years ago for nine months, and five years ago for five months. She had been ill for five weeks when Dr. Crawford saw her on the present occasion, and she never slept more than five minutes at a time. Opiates which had been tried made her worse. Before the chloral was given the temperature was found to be very high, and the pulse 130 per minute. Twenty-five grains, in two ounces of water, were administered at bedtime for three consecutive nights, with striking benefit. The first night she did not sleep much, but the talking was entirely stopped. The second night she slept for nearly nine hours, perfectly sound and tranquil, and even during the following day had several hours of refreshing slumber. The third night was equally quiet, with as much sleep, and on the following day she said she felt quite better.

Immediately after the first dose the pulse began to fall, and gradually came down to 90 by the end of the third day, and during the same time the temperature became natural. The patient suffered from no unpleasant symptoms during its administration, and has continued well since.

In this connection we may mention a case of puerperal mania recorded by Mr. A. Maxwell Adams,† Surgeon to the Royal Lanark Militia, and which he treated successfully by means of chloral.

* "Medical Times and Gazette," January 22nd, 1870.

† "Lancet," January 22nd, and April 16th, 1870.

In this case ungovernable mania broke out on the fourth day after delivery. By means of ice applied to the shaven scalp, fomentations to the abdomen, and large doses of bromide of potassium, the symptoms of slight congestion with which the case was ushered in rapidly yielded. But the mania continued with unabated fury. Forty minims of Battley's sedative solution of opium were now given without effect, and within two hours a second dose with the same unsatisfactory result. Chloroform was also tried and failed. Mr. Adams then gave forty grains of chloral twenty-five hours after her seizure. The pulse at this time was almost gone at the wrist, and her extremities were cold; but her cries were incessant, and her struggles more ungovernable than ever. In about five minutes after the administration of the chloral she became calm and sensible, asked what had been wrong, &c., complained of great drowsiness, and within ten minutes fell into a profound slumber, which lasted for about seven hours. Her pulse also gradually gained in volume, and diminished in frequency, until it fell to ninety beats per minute.

During the progress of this case the mania, which recurred periodically in an unusually severe form, has always been quickly controlled by the chloral in doses varying from forty to sixty grains.

In this case, as well as in others, Mr. Adams observed that no matter how long the urine and alvine evacuations might be retained, the former, and frequently the latter, were voided almost immediately after coming under the influence of chloral.

Epilepsy.—Dr. Pollock * publishes a case of epilepsy, occurring in an unmarried woman aged twenty-nine years.

She had been liable to the fits for ten years. Her general health was good, and menstruation regular. Bromide of potassium, in doses of from 15 grains to 40 grains, three times a-day, sulphate of zinc, quinine, and tincture of iron, in full doses, were tried without effect. Dr. Pollock then administered half-a-drachm of tincture of assafœtida, with 3 grains of carbonate of ammonia, three times a-day. The result was most satisfactory; since the first week that the remedy was tried she has had no return of the fits. Dr. Pollock suggests the employment of this mode of treatment where other remedies have failed.

Just as it is an established fact that bromide of potassium relieves certain forms of epilepsy, so Mr. Walter Tyrrell † is prepared to show that other varieties may be cured by strychnia.

* "Lancet," August 21st, 1869, p. 267.

† "British Medical Journal," August 7th, 1869, p. 145.

The form of epilepsy in which the treatment by strychnia is most successful is that in which anæmia and defective nervous control are prominent symptoms. The majority of the patients are women, and with them the disease is apt to commence at, or about the time of the first menstruation, and the attacks are more severe at the catamenial periods. In the intervals of menstruation the disease often shows itself as *petit mal*.

This treatment is also very useful in children, in whom the disease often commences as *petit mal*, and gradually passes into the severer form of epilepsy.

He considers large doses unnecessary; and, although he has given as much as ½ grain twice daily with benefit, he is now in favour of smaller doses given more frequently.

His experience extends over ten years, and he is now tabulating his cases for publication in a collected form.

Chorea.—A case of severe chorea, which occurred during pregnancy, and was successfully treated with hydrate of chloral, has been published by Dr. James Russell,* of Birmingham.

The patient, aged twenty-one, was a healthy, vigorous-looking woman, nearly five months advanced in pregnancy with her first child. Choreic movements had commenced at an early period of pregnancy, if not previous to marriage. When admitted into the Birmingham Hospital she presented a very aggravated form of chorea.

Full doses of bromide of potassium failed entirely. The hydrate of chloral was then tried. Seven doses were given in the first twenty-four hours; the first two of 10 grains, the succeeding ones of 15 grains. The first two doses produced some sleep; but after the third the sleep became more continuous, lasting successively for three hours, five hours, and three hours and a-half. Along with this there was an improvement in her symptoms when she was awake.

The chloral in larger, but less frequent doses was continued for six weeks, when she left the hospital, presenting only the symptoms of a mild attack of her disease.

Dr. F. M. Pierce† treated a case of well marked chorea with subcutaneous injections of apomorphia. The patient was an intelligent boy, eight years of age, and of the sanguine temperament. The symptoms followed a severe scald of the chest when five

* "Medical Times and Gazette," January 8th, 1870.

† "British Medical Journal," February 26th, 1870.

years of age. Four months before Dr. Pierce saw him he had rheumatic fever. The twitchings had increased very much since. There was a slight systolic bruit audible at the apex of the heart. One-fortieth of a grain was injected subcutaneously on three separate occasions, at intervals of three and ten days. Sudden vomiting occurred on each occasion, without previous nausea, in from six to fifteen minutes. He steadily improved, and was discharged quite recovered soon afterwards.

In two other cases of chorea the action of the apomorphia was beneficial, although not so distinctly as in the above case.

Tetanus.—From the property which nitrite of amyle is supposed to possess of alleviating the spasm of angina pectoris, Mr. M. Foster, of Huntingdon,* was led to prescribe it in a case of tetanus.

J. B., aged fifty-two, publican, smashed the third finger of his right hand, on December 11th, 1869. After exposure to cold, tetanus set in about the 23rd. On Christmas-day, when Mr. Foster saw him, his jaws were fixed, and on the recurrence, very frequently, of tetanic spasms, his body was rolled up into a rigid ball. Mr. Foster gave him five drops of the nitrite on a handkerchief. The inhalation of it had an immediate effect in lessening the spasms. By his directions the same means were employed on each return of the spasms. From that time onwards the spasms were *held in check* until the ninth day, when he had inhaled an ounce, and the case had become semi-chronic, with a fair prospect of recovery. He was most thoroughly supplied with nutrients, a few stimulants, tonics, and aperients. He gradually improved until the end of the month, when he was convalescent.

His perfect recovery to health has been retarded by some attacks of catarrh and congestion of the lungs; otherwise he is well.

Pain.—Dr. William Marshall,† of Surrey, has found a combination of chloroform with opiates to be a most effectual means of relieving pain. The smallest dose of chloroform, which will answer for this purpose, is 10 minims.

With the chloroform should be combined one or two drachms of the compound tincture of camphor, if the pain be moderate in severity, or 10, 20, or 40 minims of "Battley," or solution of the muriate of morphia, if more severe. This combination generally relieves pain and induces sleep *within a few minutes*, and its

* "Lancet," April 9th, 1870, p. 533.

† "Glasgow Medical Journal," May, 1869, p. 351.

effects are more lasting than those of the opiate alone, and without its disagreeable after-effects. It should be given in mucilage, or some such vehicle, to prevent the chloroform from falling to the bottom.

Sciatica.—Dr. Henry Lawson,* who is an old sciatica sufferer, attributes his restoration to health from an attack which had lasted six months, and had been gradually getting worse, to the hypodermic injection of morphia. This was employed at the instance of Mr. Ernest Hart, and was followed with the most signal and immediate success. Five minutes after the first injection, Dr. Lawson experienced the only ease he had known for nearly seven months, and by a continuance was in a few months restored to perfect health.

Since then he has applied this remedy in over thirty cases of true sciatica, and it *has never failed.* The treatment requires in some instances to be maintained and persevered in, but it gives instantaneous and effectual relief.

The salts of morphia so employed never impair nutrition—indeed, they promote it indirectly—and in recent cases they effect a cure so rapidly that the result seems almost like a charm to the pain-worn patient.

Catarrh.—Dr. George Johnson† advocates the use of the Turkish bath in the treatment of catarrh. In cases where it cannot be conveniently applied, he recommends the simple expedient of seating the patient undressed on a chair, and placing a burning spirit lamp between his feet. Two or three blankets are then folded round the patient, from his neck to the floor, so as to enclose him and the lamp. In from a quarter to half an hour free perspiration is induced, and may be kept up afterwards by getting into bed between hot blankets.

Ammonia seems to relieve some persons. Five grains of the sesquicarbonate, or a drachm of the aromatic spirit, may be taken in water every three hours. A single dose of ammonia at bedtime is an efficient and useful diaphoretic. Ten to thirty drops of spirit of camphor given occasionally is beneficial in other cases.

Bronchitis.—In the capillary bronchitis of children, even where complicated with croupy symptoms, Dr. Charles Douglas Phillips‡

* "Medical Times and Gazette," December 4, 1869, p. 654.

† "British Medical Journal," October 23, 1869.

‡ "Practitioner," November, 1869.

has found ipecacuanha, in small doses frequently repeated, a valuable remedy. He orders half a drachm of vinum ipecacuanhæ to four ounces of water—a teaspoonful to be taken every one or two hours, or much more frequently if the symptoms are urgent.

Sir J. Y. Simpson* refers to the case of a young lady whom he saw in consultation with Dr. Taylor. She was suffering under a severe attack of congestive bronchitis, with some hæmoptysis and orthopnœa. Twenty grains of chloral were given at night. This was followed by a tranquil sleep, and relief to the distressed breathing, so marked that Dr. Taylor "cannot help concluding that chloral has a directly sedative effect on the whole respiratory surfaces."

Chronic Bronchitis and Emphysema.—The importance of tonic treatment in chronic bronchitis, emphysema, and those asthma-like difficulties in the breathing consequent upon those two complaints is urged by Dr. J. C. Thorowgood.†

The general and more abiding difficulties in those cases he considers to be rather of a paralytic than of a spasmodic nature, due partly to defective primary innervation through the vagus, but more especially to impaired nutrition of the dilated air vesicles and loss of contractile force in the bronchial muscles.

In those cases we are in the habit of giving anti-spasmodics and sedatives, to ease the breath and cure the cough; forgetting those degenerations of tissue which are at the root of the symptoms we treat. Tonics are evidently indicated, and Dr. Thorowgood has found iron and nux vomica, or strychnia in small doses, to be most useful where there is constant dyspnœa with prolonged expiration.

The presence of expectoration, and of occasional fits of severe nocturnal asthma, does not contra-indicate their employment, and not unfrequently, the nux vomica relieves those spasmodic attacks most effectually. Arsenic is also a most useful medicine, and appears to promote nutrition. It acts at times like a specific.

Asthma.—Dr. J. Frederick Plomley‡ records the case of a young girl, who for some years had been a great sufferer from bronchitic asthma.

The usual remedies for asthma had all been tried without any satisfactory result. Hydrate of chloral was then given in half-

* "Medical Times and Gazette," January 1, 1870.

† "Lancet," November, 13, 1869, p. 668.

‡ Ibid., February 20, 1870, p. 300.

drachm doses, a short time before the threatened attack, with the effect of producing sleep and preventing the paroxysms. So marked an improvement has followed the administration of the chloral, that the patient describes herself as feeling quite a different person.

In the case of a gentleman, who suffered from unusually severe attacks of asthma, the hydrate of chloral was administered by Mr. Maxwell Adams* with marked benefit. In the Brompton Hospital this patient had been brought under the influence of chloroform inhalation with only very temporary relief. Thirty grains of chloral was given, his agony being excessive, and in a few minutes his breathing became quite easy, and he fell into a calm sleep which lasted for eight hours.

In many cases of severe nocturnal spasmodic asthma, without disease of the heart or lungs, Dr. Charles Douglas Phillips† has found ipecacuanha most useful. The dose which he recommends is five drops of the wine repeated every ten to thirty minutes for two or three hours, until relief comes, in which case the dose should be diminished and taken less frequently. Its emetic or nauseating effects should be avoided.

Whooping Cough.—Dr. C. Douglas Phillips‡ has before him twenty-three carefully recorded cases of whooping cough. In most of these the cough came on in violent paroxysms, continued until a quantity of viscid mucus was ejected from the lungs by the mouth, and often by the nostrils, and increased in intensity until the contents of the stomach were evacuated.

In all these cases, where the vomiting was more troublesome than the whoop, ipecacuanha gave very marked relief.

The dose which Dr. Phillips recommends is half-a-drachm of the vinum ipecacuanhæ in four ounces of water; a dessert-spoonful to be taken every one, two, or three hours, according to the severity of the cough. Children under five years old should take only a tea-spoonful of the same mixture, but many children of this age can tolerate and are benefited by much larger doses.

Mr. A. Maxwell Adams§ has lately been treating severe cases of whooping cough very successfully with small doses of the hydrate of chloral.

In children of about six years old, five grains, given two or

* "Lancet," January 22, 1870, p. 112.
† "Practitioner," November, 1869, p. 280.
‡ Ibid., November, 1869, p. 277.
§ "Lancet," February 5, 1870.

three times daily in a little syrup and water, will usually mitigate the severity of the paroxysms. In those cases in which the cough is not severe during the day, but becomes distressing after the child has been put to bed, about six grains, given only at bed-time, will ensure a comparatively quiet night. Such doses do not produce drowsiness or any bad effect.

Pneumonia—Hiccough.—Dr. John Constable* had a case of pneumonia, in which hiccough occurred of so persistent a character that it was influencing the malady very prejudicially. After everything he could think of had been tried, he resolved to make trial of morphia hypodermically injected. Ten minims of the solution of the muriate of morphia were injected under the skin over the intercostal muscles, and in a few minutes, as if by magic, the hiccough stopped completely, and did not return.

Heart Disease.—Dr. T. Clifford Allbutt† has found the hypodermic injection of morphia most useful in diseases of the heart and great vessels. "From small and timid beginnings," he writes, "I have gone forward with this marvellous remedy, until I find myself now justified in using it fearlessly in any form, and in any stage, of heart and aortic disease."

He uses the hydrochlorate of morphia, in doses varying from one-tenth to one-third of a grain; he seldom uses half-a-grain, except in such cases as intense pain from angina, or intra-thoracic tumour. He always begins with one-eighth or one-sixth of a grain, and in ordinary cases he finds one quarter of a grain the proper dose. The dose is best given in an evening, and should always be followed by perfect quiet in the room. Should there be albuminuria, the drug must be withheld, or given with caution.

The cases in which morphia thus employed is most useful are;—angina with diseased coronary arteries, &c.; neuralgic distress from intra-thoracic tumour; and mitral regurgitation. It is very valuable also, in small doses, in so-called irritable heart, whether this be due to weakness of the organ, or to instability of its nerves. It is less useful, Dr. Allbutt thinks, in diseases of the aortic valves, and less useful in mitral obstruction than in mitral regurgitation. In aortic disease, however, where the heart is big and pumping, it gives much ease.

* "Lancet," August 21, 1869, p. 264.

† "Practitioner," December, 1869, p. 342.

In his papers "On Pain at the Heart and its Neighbourhood,"* Dr. Dobell gives the following aphorisms under the head of "Management and Treatment:"—

1. When once a heart has become hypertrophied, its active nutrition should be studiously maintained, and any change in the habits of the patient with regard to exercise or diet, should be made with the greatest caution.

2. By persistently regulating the circulation in accordance with the capabilities of a diseased heart, an accommodation may be established throughout the organism to the morbid alterations in the hydraulic apparatus.

3. During the time of forced rest necessary to establish accommodation throughout the organism to morbid alterations in the hydraulic apparatus, the hygienic arrangements must be so regulated as to prevent derangement of the chylopoietic system and to promote muscular vigour.

Cynanche Tonsillaris.—Dr. F. P. Atkinson† considers that the predisposing causes of quinsy are want of tone about the system generally, owing to excess of mental or bodily exertion or long-continued fasts, chronic dyspepsia, or imbibition of alcohol before going into the cold night air (congesting as it does the mucous membrane of the throat and stomach). The exciting cause is cold, producing suppression of perspiration.

The materies morbi here selects the tonsil, in the same manner as it does in gout the great toe.

The treatment he prescribes is the following:—Bicarbonate of potash, one scruple: powdered guiacum, ten grains, or tincture of guiacum, half-a-drachm; mucilage as required; water to one ounce. To be taken, with fifteen grains of citric acid, three times a day in a state of effervescence. A gargle, consisting of twenty minims of tincture of iodine to the ounce of water (to be used by being held in the mouth, and the head shaken from side to side). Three or four glasses of port-wine daily, and plenty of beef-tea. Gentle exercise in the open air, if the weather is fine. Purgatives are unnecessary.

By following this treatment, Dr. Atkinson is able to tell his patients that they will be well in three days. After having tried all kinds of treatment on himself, both general and local, he can

* "Medical Press and Circular," vol. ii., 1869, and vol. i., 1870.

† "Practitioner," February, 1870, p. 90.

most positively say that this will be found the best. Indeed, he considers it almost a specific.

Sickness and Diarrhœa.—Dr. Charles Douglas Phillips* has found ipecacuanha administered in frequently repeated small doses most useful in "the watery diarrhœa during dentition, the diarrhœa with green evacuations, and the dysenteric diarrhœa, which are so common among children." He also points out its importance in cases of vomiting of all kinds.

Mr. C. C. Fuller† has most successfully treated the sickness and diarrhœa of children by means of drop doses of ipecacuanha wine given every hour, or less frequently in the less severe forms of the disease. The forms of diarrhœa in which it is indicated are those in which the motions are frequent and slimy, and also where they are of a grass-green colour. It is particularly useful in those cases which are accompanied by sickness and vomiting; but is also efficacious in cases not presenting those symptoms.

Given in the above manner, it has also been found by Mr. Fuller very efficacious in other kinds of vomiting.

Dyspepsia.—A number of cases of dyspepsia seem to depend upon an unstable or irritable condition of the nervous system, rather than upon deranged secretions. For these cases Dr. T. Clifford Allbutt‡ has found the subcutaneous injection of morphia the best treatment. He was led to it accidentally while treating a lady who suffered from rheumatic gout, as well as from this form of dyspepsia. Hoping, by the hypodermic injection of morphia, to be able to relieve the gout, he made the discovery that it had moreover the most happy effect upon the digestion. Several cases which are given show how the daily injection of $\frac{1}{4}$ of a grain of morphia rapidly improved the state of the patient, and cured the dyspepsia.

It appears to act by calming that irritability of the nervous system upon which the disease depends.

Constipation.—The usual professional treatment of chronic constipation is, Dr. J. Kent Spender thinks,§ highly unsatisfactory, as it has for its aim rather to overcome the present difficulty than to effect a permanent cure.

* "Practitioner," November, 1869, p. 227.

† "Lancet," December 4th, 1869, p. 768.

‡ "Practitioner," June, 1869, p. 342.

§ "Medical Times and Gazette," February 19th, 1870, p. 200.

Dr. Spender believes that chronic constipation depends upon some defect in the peristaltic action of the bowels. The plan by which he proposes to overcome this defect comprises four therapeutic factors; (*a*) minute and frequent doses of watery extract of aloes, very rarely of extract of colocynth; (*b*) a dose of sulphate of iron (gr. i or ii) always combined with each dose of the direct aperient; (*c*) regulation of the diet; (*d*) constitutional exercise. The quantity of extract of aloes in all but extraordinary cases should not exceed one grain. It is conveniently given in the form of a pill. With this pill should always be mixed from one to three grains of sulphate of iron; this is the essential point of the treatment; nothing can replace the iron.

Dr. Spender begins by desiring an adult patient to take such a pill three times daily immediately after the principal meals. He is cautioned that at first there will probably be no apparent effect, and that two or even three days may pass before any medicinal evacuation of the bowels takes place, perhaps even then difficult and discomforting. But within the next forty-eight hours there will be most likely an evacuation of the bowels once or possibly twice in the day. *Anything like purgation must be avoided*, and therefore the patient must be instructed on the occurrence of the first loose motion, to withhold a pill, and to take only one in the morning, and one in the evening. This continues to have a decided effect, and in a week or a fortnight he may require, for the same reason as before, to drop another pill. Within a month he may require only a single pill once or twice a week, and finally he may merely require one occasionally.

When pills cannot be taken, the mixtura ferri composita with the decoctum aloes compositum may be substituted, the doses being determined according to the same principles. Dr. Spender has not, however, obtained such satisfactory results by this method.

Cases illustrating the beneficial effects of the above treatment are given, and the author goes on to notice a form of constipation, observed chiefly among women, marked by intense neuralgia of the rectum after every motion. In these cases it is well to ascertain that there is no fissure of the mucous membrane, and if so speedy relief may be obtained by the following powder taken twice a day:—Sesquioxide of iron, one drachm; bitartrate of potash, one drachm; powdered cubebs, fifteen grains. Mix. This may be continued once daily for weeks or months. He concludes with this caution:—"Constitutional tuberculosis had better be let alone *quoad* aperient medicines. Peritoneal or intestinal tubercle is a grave malady to light up, and a state of comparative constipation may be nature's

method of keeping things quiet in the abdominal region. At all events aperient medicines ought to be strictly subordinate to general treatment."

Dr. F. B. Nunneley* has met with great success in the treatment of constipation by means of belladonna. The method of administration followed by him was in the main that recommended by Trousseau. A grain of extract of belladonna, and three grains of extract of gentian, were divided into six pills, and from one to four ordered to be taken on rising every morning.

It was found that the greater number of cases of constipation were associated with dyspepsia. Belladonna was given for from one to three weeks. It nearly always caused an evacuation, usually of solid stools, after breakfast on the morning on which it had been taken. Generally the bowels continued regular after the belladonna was discontinued, and sometimes headache was greatly mitigated.

In the case of a woman, aged 47 years, who had had constipated bowels for 26 years, for which she had taken pills or castor oil once a week, belladonna restored the natural daily action in 14 days. In a few cases no permanent cure was effected, but relief could be obtained by taking belladonna every second or third day. The dose had not to be augmented, and no increased constipation followed its use. In more recent cases the natural action of the bowels was restored in a few days.

Obstruction of the Bowels.—Amongst other cases which were relieved by the hypodermic injection of morphia, Dr. John Barclay,† of Banff, narrates one of intestinal obstruction. Various things had been tried for six days, without any effect, and matters were gradually getting worse, when fifteen minims of the solution of morphia were injected over the stomach. A draught of warm castor-oil and laudanum was given three quarters of an hour afterwards. It had the desired effect; the pain was relieved in a few minutes, and there was no vomiting; the castor-oil operated twice easily. From this time a slow but steady cure took place.

Bright's Disease.—Copaiba, as a diuretic, is much employed by the physicians to the Middlesex Hospital,‡ and seems to succeed in Bright's disease when other remedies have failed. It is given in a mixture, containing ten minims of copaiba, and seven minims

* "Practitioner," April, 1870, p. 217.

† "Medical Press and Circular," December 29th, 1869, p. 509.

‡ Ibid., January 5th, 1870, p. 12.

of liquor potassæ in a half ounce of mucilage and carraway water.

Diabetes Mellitus.—Dr. Arthur Scott Donkin * claims to be the first who has successfully put to the test an exclusively milk diet in diabetes mellitus.

Two well marked and advanced cases of this disease, in which this treatment was carried out, are carefully detailed by him. In the first case, although the patient felt perfectly well after the treatment, a little sugar, which remained in the urine, showed that the disease was not quite cured. In the second case, a decided cure was rapidly effected.

In the first case the treatment consisted of six pints of skim milk daily, taken, previously warmed, in four meals, at intervals of four hours. *All other food was excluded.* Opium, in four grain doses, was given each night at bed time, and one grain of sulphate of iron, and three grains of sulphate of quinine in mixture thrice daily. In the second case the treatment was similar, except that *no opium* was given, and yet a most satisfactory cure resulted.

A number of cases, illustrating the influence which opium and its constituents exert over diabetes, have been published by Dr. F. W. Pavy.†

For the full details of his observations, the reader is referred to his paper.

Opium, morphia, codeine, narcotine, and narceine were tried. Of these opium, morphia, and codeine evidently controlled the elimination of sugar. Codeine appears to possess the most advantageous properties, and Dr. Pavy thinks that it will prove a valuable agent in the treatment of diabetes. In some cases it seemed to cure the disease, in others the benefit was merely temporary.

Codeia has this advantage over opium and morphia, that while it is equally efficacious in controlling the disease, it does not exert the same narcotic effect. When given in a small dose at first, and gradually increased, nothing can be perceived beyond its effect upon the disease.

Dr. Pavy considers half-a-grain an appropriate dose to start with; in some of his cases he gave ten grains three times daily. Beginning with one grain three times a-day, giddiness and headache may be produced; it is not advisable to begin with a larger dose.

* "Lancet," October 23rd, 1869, p. 568.

† "Guy's Hospital Reports," vol. xv., 1870, p. 420.

In some cases the tongue remained very clean and moist, and the appetite was not as a rule affected.

In all the cases the form of pill was employed.

The same author records an interesting case of diabetes, which he treated by very large doses of carbonate of ammonia.*

The patient, a man aged fifty, had been treated about two years before at Guy's Hospital, and was dismissed cured. About three months before he came under Dr. Pavy's care he had been shipwrecked, and suffered a relapse of his old symptoms.

He was ordered 100 grains of carbonate of ammonia in the twenty-four hours. "It was dissolved in a pint of water, and administered in small frequently repeated portions." It had to be discontinued for ten days, on account of giddiness, sickness, and other disagreeable symptoms which it produced. Restricted diet was then put in force with the effect of diminishing the quantity of sugar in the urine. Again the carbonate of ammonia was given, commencing with 75 grains the first day, and then 100 grains as before. No inconvenience resulted this time, and in a day or two the sugar disappeared altogether. Nine days after the carbonate had been again stopped, the sugar reappeared, and it was again checked by a return to the same treatment.

"Looking at the facts of this case taken altogether, it would certainly seem," writes Dr. Pavy, "that the carbonate of ammonia exerted a controlling influence over the disease. No immediate and decided effect, however, of the kind that is produced by the administration of opium was traceable."

Incontinence of Urine.—Sir D. J. Corrigan† has been treating incontinence of urine in childhood and youth by means of collodion. (For further details see "REPORT ON MIDWIFERY."—ED.)

Eczema Rubrum.—In the treatment of this disease the two following are, Dr. J. Kent Spender‡ thinks, the main points which require attention:—(*a*) to apply something which cures as well as soothes; (*b*) never to put over that application any impervious covering.

After trying many things he found the common black wash, mixed with a tenth or twelfth part of glycerine by measure, the best application. Strips of linen are soaked in this, and after being lightly squeezed, are placed evenly and smoothly round the

* "British Medical Journal," June 26th, 1870, p. 590.

† "Dublin Quarterly Journal of Medical Science," February, 1870.

‡ "British Medical Journal," April 9th, 1870.

affected part, a portion of black oxide of mercury adhering to the linen. Each strip should overlap the one above by nearly a quarter of an inch, so as to present an uniform surface, covered by the dressing. A *thin* calico bandage will secure everything in its place. No impervious covering, such as oil silk, should be used. The dressing ought to be renewed twice daily. No harm follows its becoming dry, provided it is saturated with warm water before removal.

Psoriasis.—Dr. Robert Liveing* has had three cases of psoriasis in which Fowler's solution of arsenic had been freely administered for months, with benefit at first, but afterwards with retrogression. These he treated with copaiba, and two were rapidly cured, while the third improved.

Seven cases were treated by means of carbolic acid. It was administered in doses of from one to three grains three times a day, in the form of pill, made up with the extract of liquorice, or in solution. The result showed that, while it possessed some curative power in psoriasis, it was decidedly inferior to arsenic.

Infantile Disorders.—Dr. H. G. Knaggs † has, for eleven months, been testing the value of anointing in all manner of diseases of infancy accompanied by an unnatural state of the skin.

His category includes such diseases as atrophy, bronchitis, convulsions, diarrhœa, febrile disturbances generally, and other diseases.

The treatment consists simply in smearing with salad oil, slightly warmed, the whole surface of the body every twelve, six, or even four hours, according to the urgency of the case. A flannel gown or blanket is necessary.

The following are the advantages of this treatment over the ordinary warm bath:—

1. Skin action is more completely and permanently restored.

2. The danger of reaction is avoided, as there is no sudden change of temperature; and moreover, the sheet of oil protects the surface from atmospheric influences.

3. It acts as a fuel food, not only preventing waste of tissue, but actually increasing the bulk of the little patient.

4. It does not depress, but, on the contrary, appears to exhilarate.

* "British Medical Journal," November 13th, 1869.

† "Lancet," January 22nd, 1870, p. 114.

In the "Guy's Hospital Reports" Mr. Hinton, Aural Surgeon to the Hospital, continues his remarks on the treatment of mucous accumulation within the tympanum by incision of the membrane, and washing out of the cavity. The method he adopts is, unless special conditions exist, to make a linear incision (by a small double-edged knife), running parallel to the handle of the malleus, and about half a line posterior to it, between it and the long process of the incus. This incision he carried quite to the upper part of the membrane, but generally does not include the lower third; his reason being that, in his opinion, the mucus clings about, and becomes inspissated around the heads of the malleus, and incus, and the stapes. He cuts accordingly from below upwards, and reaches the superior attachment of the membrane. In doing this, if the knife penetrates too far, of course, the chorda tympani nerve may be divided; an accident which has happened to him once. "The patient," he says, "felt a sudden shock running down into the tongue, the corresponding side of which suffered an impairment alike of general and special sensibility, in its whole extent, as far as I was able to judge; but began to recover after two or three days. A good deal of pain followed for a short time, but the incision healed well.

Five cases are reported, of which two were unsuccessful, but these are only examples of both kinds. In the great majority of cases the result is said to have been entirely satisfactory, while other treatment had been tried in vain.

After the incision has been made, a stream of warm solution of soda (gr. x—xx ad ℥j) is forced through the orifice and the Eustachian tube by a syringe fitting the meatus, and well covered with elastic tube; the patient's head being bent forward, so that it escapes through the nose. If the case be suitable this stream will, in time, bring with it masses of mucus often quite dense and hard, sometimes evidently moulded to the Eustachian tube. This is repeated for three or four days, at the end of which time the orifice is generally closed. The incision may need to be repeated, but this should not be done within fourteen days. Of course it is supposed that the Eustachian tube has been ascertained to be pervious. The meatus is liable to take on an irritation, but care to avoid too much pressure will generally avert this. An improvement follows, sometimes, after an interval, where the immediate result has not been favourable; but the direct improvement is often very striking. The mere passage of the fluid through the tympanum seems of itself to have no influence on the hearing, not diminishing it in any appreciable degree, even for the time.

In one of the cases reported the deafness had lasted from infancy, a period of nineteen years, and the Eustachian tube was very firmly closed; this was first opened by bougies, and kept patent by an injection of arg. nitr. gr. v—ʒj. The hearing was almost perfectly restored.

The indications for this treatment are the signs of a chronic catarrhal condition of the tympanum, and evidence of the nerve-power not being greatly impaired. If the appearance of the membrane indicates (as it frequently does) the existence of more or less dense secretion behind it, being white, and more or less bulging, especially on inflation, or sunk in, and thin, in patches, which bulge on the introduction of air, with visible fluid behind them, the diagnosis is easy, but the history, in Mr. Hinton's opinion, sometimes gives ground for the proceeding, although visible demonstration of the presence of abnormal secretion may be absent.

Ophthalmology. *Report by* R. Brudenell Carter, F.R.C.S., *Ophthalmic Surgeon to St. George's Hospital, etc.*

The literature of ophthalmology, between Midsummer, 1869, and the same period in 1870, has, as far as the United Kingdom is concerned, been extremely small in quantity. The only works to be recorded are:—1. Mr. Lawson's "Manual of Diseases and Injuries of the Eye;" and 2. The Second Edition of Mr. Soelberg Well's "Treatise on the Diseases of the Eye." The "Medical Times and Gazette" has, from time to time, published the lectures on ophthalmic subjects delivered at St. Mary's Hospital by Mr. Haynes Walton; and cases of interest, but of no special novelty or importance, have also been reported from various hospitals by the "Lancet" and other journals. Among original communications to medical periodicals, the following are all that it seems necessary to note:—

Amaurosis from Smoking.—Mr. Hutchinson* communicates a case of amaurosis, apparently due to smoking, on which he takes occasion to remark that the hurtful effects of tobacco upon the

* "Medical Times and Gazette," 1869, vol. ii., p. 279.

optic nerves are most frequently seen in persons who abstain from alcohol. Mr. Hutchinson "is decidedly of opinion that the injurious influence of tobacco is, to some extent, counteracted by alcohol."

Self-illuminating Ophthalmoscope.—Dr. Lionel Beale, F.R.S.,* has contrived an ingenious mode of fixing a small paraffin lamp and collecting lens to the side of an ordinary tubular ophthalmoscope, so that the instrument carries its own light, and requires no darkening of the room in which it is used.

Operation for posterior Adhesion of the Iris.—Dr. Ogston† proposes to detach iritic adhesions by engaging the point of a fine needle in the papillary margin, opposite the adhesion, and by then pushing the margin back towards the equator of the lens, so as to stretch and tear the adhesion without exposing the iris itself to traction.

Counter-irritation in Inflammations of the Eye.—Mr. Furneaux Jordan‡ advocates the employment of active counter-irritation, by blistering, in the acute inflammatory affections of the eye. He relates a case of very severe gonorrhœal ophthalmia that rapidly yielded to the free application of glacial acetum cantharidis over the forehead, temple, and cheek.

Recovery of Sight after Atrophy of Optic Discs.—Dr. Oglesby § calls attention to the process of spontaneous recovery that sometimes occurs in atrophied optic discs, especially when the atrophy has followed acute inflammation. He says that vision may sometimes be perfectly restored. When improvement has reached a certain stage, the restoration of colour vision is the most hopeful prognostic sign, and is usually the forerunner of complete, or almost complete recovery.

Attacks of Pain caused by a Concretion in the Orbit.—Mr. Croft ‖ communicated to the Clinical Society on the 10th of December, 1869, a case in which a gentleman, aged 48, had received a blow on the margin of the right orbit from a cricket bat, thirty years previously. The eye became "depressed and protruded;" and six years later the patient began to suffer at intervals from excessively severe pain in the orbit, for which he had fruitlessly undergone various kinds of treatment. Mr. Croft discovered a hard and tender spot in the upper lid, about midway between the inner

* "Medical Times and Gazette," 1869, vol. ii., p. 725.

† Ibid., vol. i., p. 578.

‡ "British Medical Journal," 1870, vol. i., p. 153.

§ "Dublin Quarterly Journal of Medical Science," vol. xlviii., p. 529.

‖ "Transactions," vol. iii., p. 51.

angular process of the frontal bone and the eyeball. After some delay, he cut down in this spot, and came upon an ill-defined matrix, from which he enucleated a hard body, about the size of a cherry-stone, formed of laminæ, alternately buff and white in colour. The patient was completely and permanently cured by the operation; and Mr. Croft considers the concretion to be probably a calcified blood-clot, originally produced by the blow with which the history of the case commences.

MIDWIFERY AND THE DISEASES OF WOMEN AND CHILDREN, *by* THOMAS MORE MADDEN, M.D., *etc., etc., Senior Assistant Physician to the Rotunda Lying-in-Hospital, Dublin, &c., &c., &c.*

In no department of medicine has there been such marked progress within the past few years as in the practice of midwifery. The improvements which have been thus introduced into obstetrics may be very shortly summed up as follows:—

1st. Embryotomic instruments are less frequently used than was the case a few years ago.

2nd. Instruments compatible with the safety of both the mother and child are now resorted to more frequently and earlier than was formerly the case.

3rd. To a great extent, as a result of the improvements just referred to, the mortality of women in childbed is now much less than it was.

Thus in the largest midwifery hospital in the United Kingdom, viz., the Rotunda or Dublin Lying-in-Hospital, where the perforator used to be in frequent use, that instrument is now hardly ever employed, its place being taken, by the forceps, which is now resorted to in that great institution about once in every fifteen deliveries; the result is that the mortality of women in childbed there has fallen much lower than was ever previously the case. The fact being sufficiently proved by experience, that the dangers of the puerperal state bear a constant relation to the duration of the second stage of labour, which cannot be materially abridged, nor materially prolonged, beyond its proper physiological duration, with-

out increased risk to the parturient woman. Whilst on this topic, we cannot omit to notice the fact, that the grave charge recently brought against large lying-in-hospitals, of being "the hot-beds of preventible zymotic puerperal disease," has been completely refuted by the unanswerable statistics brought forward in the last annual report of the Rotunda Hospital * by Dr. Johnston, the present Master of the institution, in which it is clearly shown that the lying-in patients confined in the hospital, enjoyed a remarkable comparative immunity from preventible zymotic diseases, at a time when those diseases prevailed in the very districts in the city from which the patients were admitted into hospital, and this is accounted for, first, by the admirable hygienic and sanitary condition of the hospital, and, secondly, by the timely resort to instruments there practised.

Next, but not second, in importance to the more early use of the midwifery forceps recommended by Dr. Barnes of London, Dr. Johnston of Dublin, Mr. Steele of Liverpool, Dr. Inglis of Aberdeen, Dr. T. Beatty of Dublin, and a host of other recent writers, the most prominent place in the record of obstetric progress must be given to Dr. Barnes' introduction of the solution of perchloride of iron, as a direct styptic in the treatment of uterine hæmorrhage following labour,† which will be more fully referred to hereafter.

In the treatment of puerperal mania, chloral, the new hypnotic, has been very largely tried by Dr. T. More Madden, in the Dublin Lying-in-Hospital, and has been found productive of the most marked benefit. He has also essayed the same agent in cases of rigidity of the os uteri during labour, but has not found his expectations answered by this medicine in such cases.‡

In the treatment of the diseases of women, the vast field of investigation first opened up in this country by the publication of Dr. James H. Bennet's classic work, "On Inflammation of the Uterus,"§ in which the direct mode of examination and treatment of uterine disease were first clearly inculcated, has within the past

* "Clinical Report of the Rotunda Lying-in-Hospital, for the year ending November 5th, 1869," by George Johnston, M.D., Master of the Hospital. Dublin, 1870.

† "Lectures on Obstetric Operations, including the Treatment of Hæmorrhage," by Robert Barnes, M.D. London, 1870.

‡ On the Hydrate of Chloral as a Hypnotic and Nervous Sedative, especially in Gynæcological Practice, by Thomas More Madden, M.D. "Dublin Quarterly Journal," May, 1870.

§ "A Practical Treatise on Inflammation of the Uterus and its Appendages," by James Henry Bennet, M.D. London, 4th edition.

year been cultivated with great profit by several writers, abstracts from the most important of whose works on uterine diseases will be found in the following pages:—

Of these, few will be read with more interest or profit than those of Dr. McClintock, on senile contraction of the vagina; * Dr. Byrne on the same subject;† Dr. Matthews Duncan on parametritis and perimetritis;‡ Dr. Braxton Hicks on sea tangle tents;§ Dr. Anstie on the abuse of stimulants in the treatment of dysmenorrhœa.‖

In the records of obstetric surgery within the past year, we find the most practical tribute paid to the boldness and operative skill of Dr. Marion Sims, whose "Clinical Notes on Uterine Surgery,"¶ has produced good fruit, in the number of recent contributions to this branch of gynæcology by English obstetricians, who have, since the publication of that work, put in practice, modified, and in several instances materially improved upon the lessons inculcated by Dr. Marion Sims. Amongst recent works in the direction of progress on this subject, the last edition of Dr. Charles Clay's of Manchester "Handbook of Obstetric Surgery," ** published early in the present year, deserves special notice, as containing a clear view of most of the operations of modern obstetric surgery as practised by the author. Ovariotomy is an operation which (by the large incision), Dr. Clay claims to have been the first to introduce into England, and which in his hands appears to have been very successful. Thus Dr. Clay has operated in 71 cases of ovariotomy, the result being 49 recoveries and 22 deaths. The mortality in his hands having gradually fallen from one in two and a-half to one in four.

On the subject of ovariotomy, we have also most valuable contributions in the direction of progress in Mr. Spencer Wells' "Third Series of One Hundred Cases of Ovariotomy," by which it will be seen that the mortality of the operation has diminished greatly in his hands. Thus of Mr. Spencer Wells' first series of

* Dr. McClintock: On Senile Contraction of the Vagina, ("Dublin Quarterly Journal," Aug. 1870).

† Dr. Byrne: On Athesiæ Vaginæ, ("Medical Press and Circular," May, 1870).

‡ Dr. Matthew Duncan: "On Parametritis and Perimetritis." Edinburgh, 1869.

§ Dr. Braxton Hicks: On Sea Tangle Tents, ("The Practitioner," August, 1869)

‖ Dr. F. Anstie: On the Abuse of Stimulants in Treatment of Dysmenorrhœa ("Practitioner," Aug., 1869.)

¶ "Clinical Notes on Uterine Surgery," by J. Marion Sims, M.D. London, 1866.

** "The Complete Handbook of Obstetric Surgery," by Charles Clay, M.D. (Manchester), 2nd edition, London, 1870.

one hundred ovariotomy cases, 34 died and 66 recovered. Of the second 100, 28 died and 72 recovered. But of the third series of 100 cases, only 23 died and 77 recovered.*

A very interesting case of ovarian dropsy is recorded by Dr. Ritchie of Edinburgh.† Other papers on operative obstetric surgery, by Dr. Palfrey and other recent writers, will also be found in the following abstract.

On the Diseases of Children we have comparatively less progress to record. Thus on the most important question of infant feeding, we must still point to Dr. Routh's Manual, now in its second edition.‡ Dr. Edward Ellis, Physician to the Victoria Hospital for Sick Children, by his recent work on diseases of children,§ has contributed more in the direction of progress on this subject than any other recent writer. Great prominence is given by Dr. Ellis to the diatheses, as affecting the acute diseases of children in a large proportion of cases, and as a result much modifying the ordinary treatment. Dr. Ellis, in the treatment of the acute diseases of children, advocates, and appears to have used with success, very powerful remedies, such as aconite and veratria in small doses.

In the treatment of nævi, Mr. George Porter, Surgeon to the Queen in Ireland,‖ and Mr. T. Holmes, of St. George's Hospital,¶ have introduced considerable improvements, which will be found detailed in the proper place.

Mr. Holmes' operation for extroversion of the bladder in children, is one of the highest achievements of modern plastic surgery, and will be found fully described,

Dr. Barnes** is of opinion that if we rest satisfied with the short forceps of Denman, we shall only have a feeble tractor, a feeble

* A Third Series of One Hundred Cases of Ovariotomy, by J. Spencer Wells, F.R.C.S. ("Royal Medical and Chirurgical Society's Transactions," 1869.)

† Case of Ovarian Dropsy, by R. P. Ritchie, M.D. ("Edinburgh Medical Journal," March, 1870.)

‡ "Infant Feeding, and its Influence on Life," by C. H. F. Routh, M.D., 2nd edition.

§ "A Practical Manual of the Diseases of Children, with a Formulary," by Edward Ellis, M.D. London, 1869.

‖ On the Treatment of Nævi by the Infection of Carbolic Acid, by G. Porter, F.R.C.S.E., ("Medical Press and Circular," August, 1869.)

¶ "The Surgical Treatment of the Diseases of Infancy and Childhood," by T. Holmes, F.R.C.S., 2nd edition. London, 1869.

** On the Powers of the Long Forceps; "Lectures on Obstetric Operations," pp. 21, 22. By Robert Barnes, M.D., F.R.C.P. London, 1870.

lever, and an instrument having almost absolutely no compressive force. It is obvious that such a forceps can have but a restricted application. It can only serve to deliver the child when the head is in the pelvis, when very little tractile power is required. The consequence of this in practice is, that we are driven, in a multitude of cases, to perforate and destroy the child. Such an alternative may well make us reflect whether we cannot extend the powers and applications of the forceps. By simply lengthening the blades and shanks, and giving the blades an additional curve, adapted to the curved sacrum, we can reach the head detained on the brim of the pelvis. By moderately lengthening the handles, and making the instrument stronger, we increase the leverage and tractile power, and we gain a moderate compressive power. Thus we bring within the saving help of the forceps, a further number of children that must otherwise be given up to the perforator or run the risk of turning.

In the introductory portion of his lectures on this subject, Dr. More Madden* gives a resumé of the history of the various modifications which have been introduced in the construction of the midwifery forceps, and contrasts the results of the early operative interference in labour cases, which he recommends, with those of the practice formerly adopted, by an analysis of the vast mass of statistics bearing on this point of the Dublin Lying-in Hospital from the middle of last century down to the present time. He concludes this part of his course of Lectures with this observation :—

"So much for the statistics of this operation; and dry as these figures must, I fear, seem, yet I venture to think that at any rate what has been just said will be of great service if it only impresses on your minds the fact that, in skilful hands and in fitting cases—and in no others should it be employed—the application of the forceps is, *per se*, a comparatively safe operation, both to the mother and child. Thus, in forceps cases, even under unfavourable circumstances, only one of thirty-four of the mothers is lost; whilst, in craniotomy cases, not only are all the children destroyed, but, moreover, one in every five of the mothers is lost."

Describing the midwifery forceps which he recommends, he says :—

"The forceps I employ differ in several respects from the short forceps generally used, and has been made by Mr. White, of Sack-

* "On an Improved Form of Midwifery Forceps, and on the more Frequent Use of the Forceps in Obstetric Practice." By Thomas More Madden, M.D.

ville Street, in accordance with my directions. The measurements of this forceps are as follows: Length of instrument, 10½ inches; length of blades, 6½ inches; length of handle, including lock, 4 inches; widest space between blades when locked, 2⅞ inches; interval between points, 1¼ inches. The curve of the blades is very gradual, and commences half an inch above the lock, the space between which and the commencement of the curve of the blades is bevelled internally, and bent slightly outwards to form a space for the finger of the operator. The blades are only 1⅓ inch at their widest point, which is just 3½ inches from lock. They are tapered very gradually to and from this point, and are fenestrated as nearly as possible throughout their entire length, and as thin as is consistent with strength. Special care has been paid to the avoidance of any sharp edges or points. The handles are checker-worked in the old fashion, and the total weight of the instrument is only 8¼ ounces.

"The modifications introduced into the construction of this forceps, trivial as they may appear separately, are, I venture to think, of advantage in facilitating the application and use of the instrument. The fenestra being very wide in proportion to the width of the blades, the rims of the fenestra are much thinner than is usual, so that when the forceps is applied to the head, the protuberances of the parietal bones projecting through the fenestra almost completely project over and conceal the rims, so that there is less probability of the maternal structures being injured during the extraction, being in closer contact with the child's head than is the case when the ordinary forceps are used.

"My chief dependence on the short forceps is as a simple tractor rather than as a lever or compressor. The ring between the locks, into which the fore-finger of the right hand is introduced during extraction with my forceps, will be found of material aid to the operator, and I generally rely mainly on this, and seldom find it necessary to use any degree of power with the handles.

"This forceps, moreover, fits the fœtal head closer than any forceps I have used, and is, therefore, less liable to slip, being so curved that the blades are in close apposition with the head throughout their entire length, and exercise an equal degree of pressure on every part of it with which they are in contact. In some of the modern forceps on the table you observe that the blades are so sharply curved that the instrument is in contact with the head at two points only, on which, therefore, an injurious degree of pressure must of necessity be made.

The shortness of the handles makes the application of the forceps much more facile to the operator, and the instrument is, of course, more easily carried, occupying less space than Beatty's, Churchill's, or any other short forceps commonly used, and can be more readily slipped on without making an unnecessary parade of your instruments before the patient's friends, although you should never, if possible, apply the forceps without a consultation, nor without apprising the patient that you are about to assist her.

Pressure on the child's head beyond a safe limit is guarded against by the lesser strength of the blades and shanks of this

forceps, which only admits of a limited degree of compressing power being used."

The cases in which this form of forceps may be used are thus described;—

"In cases of difficult labour, if the violent, painful, and, at the same time, powerless expulsive uterine efforts of the second stage be permitted to continue too long unassisted, a state of inertia will probably intervene, the pains gradually becoming weaker; it may then become impossible to re-arouse the worn-out contractile power of the uterus, and this inertia may prove fatal when too late the necessary assistance has been given, by resulting in uncontrollable flooding.

"Rupture of the uterus is another occasional consequence of delay in the second stage of labour. The uterine walls being torn through by the forcible and spasmodic action which a little assistance afforded at the proper moment might have directed and aided in effecting a safe delivery. Nor are these the only evil consequences of that morbid dread of instrumental assistance in midwifery cases under any circumstances which still lingers in the minds of some practitioners. Lacerations, contusions, inflammation, and sloughing of the recto-vaginal or vesico-vaginal septa, or of both, are too often the result of the long-continued pressure of the child's head on the soft parts in cases of protracted labour; and I have seen deplorable cases of this kind resulting from neglecting to apply the forceps, as well as from its premature, or improper, use.

"The child, too, is as much endangered as the mother by undue delay in the second stage of labour. The fœtal head suffers from the protracted compression to which it is thus subjected, and there is a strong probability that the uterine contraction, acting directly on the child after the rupture of the membranes, may exercise a great degree of pressure on the child's body, and, by compressing the funis, cause its death. This danger to the child would, in my opinion, not only justify, but demand our immediate recourse to the forceps as soon as we have any reason to apprehend danger to the child from the further protraction of the labour. It surely can need no argument to demonstrate the fact that it becomes our unquestionable duty, when we believe that the child's life is in danger, to interfere the moment it becomes possible to do so, and to rescue the child from perishing in the womb, as well as to save the mother's life. The practitioner who, under such circumstances, would hesitate to deliver at once with the, forceps would incur, as I believe, the same moral guilt that would rest on a man so void of humanity as to pass by a drowning fellow-creature whom he might have rescued from death by stretching forth his hand.

"Slight disproportion in size between the mother's pelvis and the child's head was the cause which led to the use of the forceps in nine of my cases; and even a more considerable degree of disproportion may be successfully treated by this operation. It should not be rashly concluded that because a woman has some pelvic

deformity, and because her medical attendants in her previous labours resorted to the perforator and crochet, that you must abandon all hope of saving the child's life. On the contrary; a very short time ago I attended a woman who had been delivered by the perforator and crochet on her two previous labours, there being some flattening of the curve of the sacrum, but who now gave birth to a well-formed living child at the full period by the natural efforts. Cases have been recorded in which living children have passed through a pelvis scarcely measuring three inches; so that even a considerable degree of pelvic deformity may admit of the successful application of the forceps.

"In such cases it may be a matter of extreme difficulty to move the fœtal head with the forceps, notwithstanding that it is accurately adjusted, and all the powers of the instrument, so far as compatible with safety, have been fully applied. It may happen that the accoucheur's efforts have been thwarted by rigidity of the soft parts, or that the child's head is not yet sufficiently moulded and compressed by the natural efforts—in other words, that the forceps were applied too soon; and if the instrument be withdrawn for a time, we may again introduce it with perfect and facile success. If, even then, when the practitioner knows that no impediment is offered by the soft parts, and that the head has had due time to accommodate itself to the pelvic cavity, he finds it impossible to effect delivery; still, let him not be disheartened, and, by abandoning the forceps, take away the only chance that remains for the child's life. On the contrary; let the forceps be again withdrawn and again re-applied, but in another position, and again in another, as long as is compatible with the safety of the mother; and, in the great majority of cases, he will thus succeed where a less patient practitioner would have failed.

Having passed a catheter to secure an empty bladder, ascertained the exact position of the head and condition of the os by a careful digital examination, having spoken to the friends, and attended to other preliminaries fully detailed by Dr. Madden, and to which he attaches much importance, he says:—

"The operator now sits down behind his patient (who is to be placed in the ordinary obstetric position, on her left side, with her hips projecting well over the edge of the bed), facing the perinæum, and introduces the index and second fingers of his right hand, previously smeared with lard, up into the vagina behind the symphysis pubis, and passes them round half the circumference of the pelvis on the child's head, until he comes in contact with the ear, which is generally towards the left iliac region, and sometimes on the right or towards either side of the pelvis. The ear should always be felt distinctly before the short forceps are introduced, and although some recent writers do not approve of this rule, yet I generally act upon it in my own cases. The forceps should always be applied in the oblique diameter of the pelvis.

"The instrument being warmed is to be smeared with lard, and the upper blade, the first to be introduced, is taken in the operator's left hand, and, being held as lightly as a writing pen, is, during an interval in the pains, to be slowly insinuated by a gentle, wavy motion, between the two fingers of the accoucheur's right hand, which, as I have already said, rest over the ear and the child's head, until it has passed so far up that the lock lies close without the perinæum. The anterior, or pubic blade, is always introduced first in this hospital, but in England the reverse is generally the case. The instrument must, in the first stage of the process, be passed upwards and backwards in the direction of the lower axis of the pelvis, but almost immediately it must be turned in the axis of the upper portion of the pelvis, upwards and forwards.

"The point of the blade is to be kept in contact with the fœtal head, as the moment it diverges from it, the least degree of force might drive the instruments through the vesico-vaginal or recto-vaginal wall, the direction of the point being determined by the angle at which we keep the handle, so that, except at the moment that the instrument passes over the ear, when the handle must be depressed a little during the introduction of the blade, the handle should be gradually raised as the forceps slides over the convex head of the child.

"The handle is then to be given to an assistant to retain *in situ*; the operator, holding the instrument with the right hand, introduces two fingers of the left in the same manner as before, and passes up the other blade of the instrument, until the locking parts are in juxta-position, when, having passed the finger round the lock to guard the soft parts from being caught by it, the forceps may now be locked.

"In locking the forceps, as in its application, force is unnecessary and unjustifiable. If the blades have been properly introduced and applied to the head, there will be no difficulty whatever in locking them. If they are not properly adjusted, no degree of force can be of the least use, and as it is essential that the forceps be properly locked before any attempt at extraction is made; if there should be any difficulty in locking, no time should be lost in trying to bring the instrument into apposition, but the blade last introduced must be at once withdrawn, and re-introduced in the right position.

"The extraction of the head is generally the easiest part of the operation, provided that the operator, bearing in mind that the axis of the pelvis is a curved line, the axis of the inlet being downwards and backwards, and that of the outlet downwards and forwards, makes his traction to correspond with this. At first he pulls downwards and backwards, and, as the head descends, alters the direction of his force until the head comes to distend the perinæum, when he draws the head directly forwards.

"As a rule, delivery with the forceps should be as close an imitation of natural labour as possible. That is to say, bearing in mind that in natural labour the advance of the head is so slow and

gradual, that the progress effected by each pain is almost imperceptible, the forceps should be so gently used as to imitate in the slowness of its action the course which nature herself points out.

"The powers of the instrument should be exerted in the most gradual manner, except in certain cases of complex labour where immediate delivery is essential, and no attempt at finishing a tedious labour by any sudden and forcible effort is justifiable; nor should any desire to relieve his patient from suffering, or himself from a wearisome task, induce the practitioner to attempt by force what time, patience, and skill can alone safely accomplish.

"The old rule of waiting for a pain before commencing to draw down with the forceps, and of acting in concert with the uterine expulsive efforts, is obviously well founded, and should be acted on whenever the pains have not ceased before the forceps have been applied.

"As soon as the occiput escapes from the vulva, it is generally advisable, in order to prevent the risk of lacerating the perinæum, to trust the case to nature, and if there be sufficient uterine action to accomplish the labour, the instrument should now be unlocked, and the superior and then the inferior blade gently removed, and the head forced out by pressing well on the perinæum during the pains.

"After the head has descended into the pelvic cavity, the short forceps may be used in three different positions.

"1st. Where the head is delayed at the outlet, the face lying in the hollow of the sacrum, the occiput under the arch of the pubis, and the sagittal suture lying in the perinæum, the ordinary position at the end of the second stage of natural labour.

"2nd. When the labour is delayed by the malposition of the head, the face being turned forwards towards the symphysis pubis, the occiput and vertex being opposed to the sacrum and perinæum respectively.

"3rd. Where the face lies to either side.

"In the first position, delivery according to the rules already laid down is generally easy enough. In the second variety of position, the lock will be at the vertex and the point at the chin, and, by depressing this, the occiput will be drawn forwards from the perinæum. The management of the third position demands no special mention.

"Forceps cases require to be very carefully watched during the period of convalescence after labour. As a rule, if the operation has been properly performed, the recovery of the patient will be as speedy and perfect as after a natural labour. But, even after the best obstetric operations, peritonitis, metritis, puerperal fever, inflammation of the pelvic structures, may follow an instrumental delivery. This fact should be borne in mind, so that the moment the earliest premonitory symptom of any of these diseases manifest themselves, they may be at once met with the appropriate treatment. After all cases of protracted labour, and especially after forceps cases, the state of the urinary function should be watched closely for the first few days, and if there be any retention, the catheter should be used at least twice a day."

On Using the Short Forceps, with the Patient in the Supine Position. By ANDREW INGLIS, M.D., *Professor of Midwifery in the University of Aberdeen.*

Dr. Inglis* has for some time adopted the supine position for the patient, when the head is low in the pelvis. She lies close to and nearly parallel with the side of the bed, and with her head low. The left half of the forceps is the one first put in. If the fœtal head is near the outlet, introduction of the hand into the vagina is unnecessary; but if a little above the outlet, two fingers should precede the blade into the vagina, to guard and direct. In entering the point the instrument is held like a male catheter, though with the handle inclined slightly towards the right groin, and, as the blade is pushed on in the direction of the pelvic axis, the handle gradually comes nearer the middle line, and is depressed in exactly the same manner as that of the catheter. The second half is passed in the same way as the first.

Dr. Inglis claims the following advantages for introducing the forceps in the supine position:—The use of the supine position in the manner just described saves all the trouble and the formidable appearance involved in the dragging down to the middle of the bed, and placing across, with the breech projecting over, that have to be gone through with the lateral. Then, again, there is little or no difficulty in keeping the patient in position; she has comparatively little tendency to be restless, the disturbance to the soft parts being reduced to a minimum. In proof that the disturbance to the soft parts is very slight, he mentions that he has, in more than one multiparous short-forceps case, where inertia was the cause of the delay, introduced the blades and locked without the patient being aware of the use of instruments, though quite awake and expecting them to be applied.

In most cases, after the blade has been passed a little way in, but little guidance will carry it on to the proper distance and in the proper direction. The weight of the handle is, till the shank reaches the perinæum, about all that is needed for the purpose; and the proceeding, if not then complete, as it usually is, can easily by pressure be made so.

Dr. Inglis believes that the importance of observing the supine position when possible, and of inserting the forceps from the front, is very great. Not only is the perinæum in some degree in danger

* "The Medical Press and Circular," June 8th, 1870.

in all primiparæ, but in some multiparæ, when extraction is difficult, the soft parts suffer from the liberties necessarily taken with them; it is therefore incumbent on us, under all circumstances, to use the best means which enable us to avoid irritating or impairing the vitality of these parts. It can only be in multiparous cases, where the soft parts are lax, that we can dare to tighten them up without fear of a rupture; but even then there can be no special inducement to do so.

Temperature of the Body during Pregnancy and Parturition.

Mr. Squire, in a paper in the ninth volume of the "Obstetric Transactions," states that—

"The temperature of the body is somewhat increased during pregnancy, at least, in the latter months. The normal temperature may be taken at 98·75°, the temperature after the sixth month of pregnancy will frequently be found somewhat over 99°. Some remarkable oscillations of temperature, such as we need not expect to find in pregnancy, have occurred in a few cases which have presented themselves to me for notice, which tend to show that there is a considerable fall in temperature on the occurrence of the catamenia, and a considerable rise shortly before; in one instance the vaginal temperature was found to be 99·8° on the day before the catemenial flow, and only 97·3° on the day after. The difference between the vaginal and axillary temperatures will seldom be more than one third of a degree, and frequently only one fifth, or one tenth, if in the latter situation, all the requisite precautions to secure accuracy are observed. In this way, 98·45° was obtained as the normal temperature in the axilla, and 98·75° in the vagina, where there were no disturbing circumstances; in a case of abortion at two months the vaginal temperature on the ninth day was 98·4, the axillary temperature 98°.

"The commotion and efforts of parturition itself, whilst confined within the ordinary and safe limits of natural labour, cause but a slight elevation of temperature. In the twelve cases, of which tabulated diagrams accompany this paper, this point was made the subject of exact observation in cases 1 and 9.

"It had previously attracted my attention in a case of prolonged first labour, which came under my notice last autum, where there was a great heat of surface, thirst, and remarkable dryness, and heat of the passages, but no corresponding effect on the thermometer; the patient had passed a night without sleep, and the greater part of the day without food; egg and milk, and a liberal supply of beef-tea, enabled the second stage of labour to be completed favourably. In Case No. 1 on the diagram the labour was more rapid, but of some severity, with considerable agitation, heat and perspiration, and the development of the passages proceeding rapidly, the axillary temperature could not be obtained at even

the usual standard; there was, however, a progressive increase shown by the thermometer used in the vaginal examinations; the highest reading obtained half an hour before delivery here was 99·9°, in the axilla only 97·8°. In Case No. 9, where the labour was more rapid, but much less severe, the temperature per vaginam, two hours after commencement of labour, was 98·9°; in a similar observation, taken twenty minutes before the expulsion of the child, it was 99·1, and ten minutes after exactly 99°.

"The elevation of temperature thus occasioned is maintained to the termination of labour; then commences a steady decline, which, in most cases, if not all, has reached the normal line, and, in some cases, has descended considerably below it. This subsidence always takes place in the first twenty-four hours; it may, however, be prolonged into the second day, as in Case No. 9, or accomplished within the twelve hours, as occurred in Case 6.

"In all the cases here investigated, the most constant and most obvious disturbance of temperature is that which occurred during the formation of milk. The commencement of this reaction is most regular, it attains a certain prominence forty-eight hours after delivery. In only one of these twelve cases was this rise of temperature retarded, in only two was it accelerated.

"The conclusions offered, fairly deducible from these observations are:—

"1st. That no great elevation of temperature arises in natural labour.

"2nd. That there is afterwards a considerable fall of temperature, which is favoured by sleep.

"3rd. That there is a subsequent exaltation of temperature, which has for its natural termination the secretion of milk.

"4th. That the bringing the method of observation here followed to the study of the puerperal state, would add an element of certainty to the principles and details of its management, and afford an additional guide for safe conduct through some of its complications."

Dr. Barnes *on the Treatment of Post Partum Hæmorrhage.*

In a paper read before the London Obstetrical Society, Dr. Barnes defines the condition on which the arrest of hæmorrhage after labour depends, and the action of the remedies ordinarily employed. The remedies generally used depend for their efficacy, says Dr. Barnes, on the power of exciting contraction of the uterus; this presupposed force being enough to respond to excitation; but when this was exhausted remedies failed. It became then necessary to seek a new power that would act under the condition of exhausted contractility. This was found in styptics, like perchloride of iron, which acted by coagulating the blood in the mouths of the upper vessels, and corrugating the inner surface

of the uterus. Acting exactly when ordinary means failed, it was a new power to save women from dying of hæmorrhage. Examining the action of ergot, compression of the uterus, and cold, he urged that these should not be trusted if they failed to act quickly, for if they so failed, it was probably because contractility was gone. If persevered in beyond this point they did harm.

In his own practice, Dr. Barnes employed the perchloride in three orders of cases. In the first all recovered well, the hæmorrhage being immediately stopped; in some of these, death would have almost certainly ensued but for the remedy. In the third, death followed, but the patients were moribund when the styptic was applied; it came too late: here the proper remedy was transfusion. The practical lesson resulting from a review of these cases was, to observe the rule he had laid down, not to persist too long in the use of cold, kneading, and other remedies, but to resort to the perchloride before collapse had set in.*

Dr. Barnes, in his "Lectures on Obstetric Operations," thus describes *the mode of using the perchloride of iron*—

"An important preliminary step is to clear the uterus of placental remains and clots, so that the fluid when injected may come into immediate contact with the walls of the cavity. At one time it was my habit to wash out the uterus with iced water first. I now prefer not to lose time in doing this. Besides, at the period when the perchloride is especially indicated, the exhaustion is generally so great that the injection of iced water is ill borne. I am inclined to think that, under the circumstances, the injection of iced water is more hazardous than the injection of perchloride of iron.

"You have the Higginson's syringe adapted with a uterine tube eight or nine inches long. Into a deep bason or shallow jug pour a mixture of four ounces of the liquor ferri perchloridi fortior of the British Pharmacopœia, and twelve ounces of water. The suction tube of the syringe should reach to the bottom of the vessel. Pump through the delivery tube two or three times to expel air, and insure the filling of the apparatus with the fluid before passing the uterine tube into the uterus. This, guided by the fingers of the left hand in the os uteri, should be passed quite up to the fundus, then inject slowly and steadily. You will feel the fluid come back into the vagina mixed with coagula, caused by the styptic action of the fluid. The hæmostatic effect of the iron is produced in three ways; first, there is its direct action in coagulating the blood in the mouths of the vessels; secondly, it acts as a powerful astringent on the inner membrane of the uterus, strongly corrugating the surface, and thus constringing the mouths of the

* "Lancet," December 11th, 1869.

vessels; thirdly, it often provokes some amount of contractile action of the muscular wall."*

Mr. Garraway *On Turpentine in Uterine Hæmorrhage.*—A very interesting case illustrating the use of turpentine in very alarming secondary hæmorrhage is recorded by Mr. E. Garraway, of Faversham:—

"Mrs. ——, aged 28, was confined of twins on May 3rd. She was quite exhausted after the birth of the first child, and the uterus was only roused to expel the second by giving ergot, after which no further contractions occurred. No compression nor kneading of the organ would induce it to throw off the placenta. An hour elapsed; and not liking to give more ergot, I passed my hand into the uterus, and found both placenta entirely adherent. They were removed easily, and no blood was lost, though subsequently, there was some slight hæmorrhage. Mrs. —— remained weak, and was ordered a more liberal dietary than was usual."

"On the third morning I was sent for to see her dying. My first impulse on entering the room was to call her husband upstairs to take leave of her; my second to attempt her restoration. She was bathed in a cold sweat, perfectly insensible, and breathing by hurried gasps; her pulse 140, was just perceptible, one hand becoming blue and shrivelled. The tale they told me was this: Mrs. —— had been permitted contrary to my orders to put the children to the breast. An hour-and-a-half afterwards, the nurse perceived, as she termed it, 'a great change,' and sent for me. Having a stomach-pump and turpentine with me, I immediately passed the œsophagus-tube as far as possible up the rectum, and injected an ounce or more of turpentine diffused in mucilage, and at the same time covered the abdomen with hot flannel sprinkled with turpentine. In four or five minutes the respiration became freer, an occasional sigh was heaved, which appeared to do immense good by more fully inflating the lungs. Soon the eyes opened and wandered round the room. Deglutition now became possible, and a teaspoonful of brandy with ammonia was got down, followed quickly by an egg beaten up with brandy, sugar, and milk; and now the patient fairly rallied. I left her in an hour or two. At my next visit she had not the slightest recollection of my having seen her or done anything for her that day. I believe the injected turpentine lighted up the dying embers, and enabled the stomach to receive the subsequent fuel which was laid on, of course with no unsparing hand."†

A Remarkable Case of Complex Labour by Dr. T. More Madden.

On the 9th of February last, Dr. More-Madden was sent for to visit a patient attended from the extern-maternity attached to the

* "Lecture on Obstetric Operations, including the treatment of Hæmorrhage," by Robert Barnes, M.D., p. 486. London, 1870.

† "British Medical Journal," July 10th, 1869.

Lying-in-hospital, by the pupils on duty, Messrs. Robertson and E. B. Roche. This patient had been in labour, and the liquor amnii had been evacuated for twenty-four hours before the attending pupils had been sent for. When they arrived they found about three inches of the cord prolapsed, and two feet with a rounded tumour behind them presenting. They not unnaturally concluded this was a head, and as the cord was pulsating strongly, endeavoured to return the prolapsed funis. In doing so it was discovered that the rounded tumour was not the head, but the head tightly jammed down, the uterus being strongly contracted. The presentation was as follows:—two feet at the posterior part of the vagina, the heels to the sacrum, and the toes pointing directly forwards. The feet could be circumscribed and followed up to the lower part of the legs, where they were tightly clipped between the head and the promontory of the sacrum. There was a loop of the funis about three inches prolapsed between the feet (pulsating between the pains).

"The head lay in the second position, or perhaps rather more transverse, and was jammed down upon the feet and chord. As the uterus was so strongly and tightly contracted upon the fœtus, Messrs. Roche and Robertson, without any delay, made a decided effort to push the feet and cord above the head, but so tightly were they caught between the head and pelvis that they could make no impression on them. Dr. More-Madden was now sent for, and finding the state of things as described, proceeded at once to apply the long forceps in hope of bringing down the head past the feet. They, however, failed to make any impression, whether applied in the transverse, or occipital frontal diameter, and were abandoned. She was put deeply under the influence of chloroform by Mr. Roberts. Dr. Madden then introduced his hand into the vagina, and the parts being more relaxed, was able with some effort to draw down a foot as far as the perinæum. This was then secured, while he again passed up his hand, and then combining their efforts, Dr. Madden making pressure on the head, while Mr. Roche made forcible traction on the foot; and after these efforts had been continued for some time without apparent effect, the fœtus suddenly rotated, the foot came down, whilst the head receded; the birth was then easily completed, and the child was born alive, although apparently asphyxiated, and was resuscitated by the diligent employment of the ordinary means.

"There was a deep indentation on the right parietal bone where the feet had been compressed between the head and the pelvis. It should be observed that the child was well formed and above the average weight The mother convalesced rapidly, together with the child, and was alive and well when last visited several days after her delivery.

"Dr. More-Madden remarked that there were three points which appeared to him worthy of remark. The first was the rarity of such a compound presentation as this; secondly, the unusual fact of a full grown fœtus being delivered alive by turning in a case where the funis presented; and, thirdly, the treatment adopted. With regard to the extreme rarity of such a case, Dr. Madden stated that he

had searched the records of the Dublin Lying-in-Hospital from the first to the last published report without finding a similar case, nor was there such a case in either Drs. Churchill or Ramsbottom, or any of the standard text books of midwifery. The only case at all similar was one described by Mauriceau, which he quoted. With regard to the practice adopted in the case, Dr. More-Madden said that his reasons for applying the forceps in the first instance were, that when he was sent for the head was low down in the pelvic cavity, the feet were up at the brim of the pelvis, the liquor amnii had been evacuated for twenty-four hours, and the uterus was strongly contracted on the body of the child. Therefore, knowing, as he did, from his own experience on previous occasions, the difficulty of version under such circumstances as the latter, he resolved on applying the forceps, which, if successful, could be used with greater safety to the mother than generally attends the operation of version, and if very properly and very carefully applied, without danger of compressing the funis. This failing, however, he resorted to version, and succeeded in accomplishing it. The operation was not, as might possibly be supposed, the mere extraction of the child by drawing down the feet, for it actually amounted to version, and something more than version. For in the first place it was necessary to push the head out of the pelvic cavity where it was lodged, through the brim back into the closely contracted uterus; and the amount of force which this required, and which of course must be limited and determined by the amount which might be employed with safety to the mother, avoiding the imminent danger of rupturing the uterus, was no easy matter to calculate aright. But at any rate the operation was completely successful, and he had the satisfaction of accomplishing the delivery with safety to mother and child, under circumstances of some difficulty, and fortunately of extremely rare occurrence."*

Senile Contraction of the Vagina. *By* ALFRED H. M'CLINTOCK, M.D., F.R.C.S., *ex-Master of Dublin Lying-in Hospital, etc.*

"In what I may call the minor forms of this contraction," says Dr. M'Clintock,† "we find simply a transverse fold of the vagina projecting inwards, and presenting to the finger a sharp crescentic edge. This seldom engages more than the one-third or one-half the circumference of the canal, and is generally situated on the posterior wall, a little better than half-way up; but I have also met with it higher, or implicating the os itself by one or other extremity of the semi-lunar valve-like projection.

"There is another and more important variety of this species of contraction, which I have occasionally observed, and to which I now beg to direct your attention. It is hardly necessary for me to remind you that the upper part of the vagina, in the normal and healthy state, is very capacious and distensible. The finger can be

* Abstract of a Paper read before the Dublin Obstetrical Society. "Dublin Quarterly Journal of Medicine," May, 1870.

† "The Dublin Quarterly Journal of Medical Science." August, 1870.

freely passed in front, behind, and around the cervix uteri, to the full depth of the vaginal cul-de-sac. In married women, and especially those who have borne children, this capaciousness is more remarkable than in virgins; but even in these the finger can be freely carried round the cervix. This state of things is quite altered, however, by the species of contraction I now wish to describe, in which there takes place a progressive diminution of the calibre of the vagina—not throughout its entire extent, but commencing at its summit and slowly advancing downwards. When the contraction has reached the level of the os tincæ, the introduction of the finger into the vaginal cul-de-sac around the cervix becomes quite impossible, the cervix being so closely embraced by the broad ribbon-like stricture.

"With the persistent increase of the constriction the os and cervix become quite incapsulated, and beyond the reach of touch or sight. The foramen through the stricture, in two of my cases, was so small as barely to admit a probe, and might very readily have been mistaken for the os uteri itself. How much lower down this process of contraction may extend I cannot at present say, the cases which have been longest under my observation being married women; and I should imagine that sexual intercourse would tend to hinder or retard the progress of the contraction downwards. The feel of the constricted parts of the vagina did not present anything peculiar beyond the simple narrowing of its calibre. There was no perceptible induration to the touch, or change in the appearance, as seen through the speculum. The feel and condition of the part, therefore, presented characters very different from what we find in the cases of vaginal constrictions resulting from cicatrices supervening on inflammation and sloughing. In none of the cases was there the remotest ground for supposing that the contraction of the vagina could have been so produced. Neither did it in any instance depend on cancerous or other organic disease; but yet I do not see anything impossible in this complication taking place.

"All the cases I have met with were women advanced in years, between fifty and sixty, only one was under fifty; and on this account I am disposed to regard it as some sort of atrophy connected with the decline of life, and the extinction of functional activity in the generative organs. On this presumption, as well as from the want of a better designation, I have ventured on calling it 'Senile contraction of the vagina,' which may serve to distinguish the lesion till some better name be found, or till its dependence on some other lesion as a cause be established. In old women I have often seen considerable narrowing of the uterine orifice, with a contracted or impervious condition of the cervical canal; and this I would refer to the operation of a like cause as that which induces the vaginal contractions I have been speaking of. Again, the shrivelled, atrophied state of the uterus, so common in women far advanced in years, may probably be regarded as another illustration of the same process.

"The diagnosis of these senile contractions of the vagina was easily made in every instance, and I can hardly imagine a difficulty

presenting itself to any careful examiner possessing an ordinary amount of tactile experience. Still, it may be useful to mention that I have known this stricture of the vagina mistaken for the contraction of scirrhous deposition; and Dr. Byford, as already stated, mentions a case where an intelligent practitioner thought the stricture was the effect of strong caustics.

"All the examples that have fallen under my notice of this lesion were married women. Some had been sterile, but more than half had borne children. Only one patient was a widow; all the others were married, and living with their husbands. In every instance the menstrual function had ceased, even in one of the cases where the lady's age did not much exceed forty years. The evidence I at present possess leads me to look upon this affection as a comparatively unimportant one, so far as regards prognosis and treatment, inasmuch as it does not seem to have any injurious influence upon the local or general health. The patients in whom I detected the lesion are all still living, I believe, though it is several years since I ascertained its existence in some of them.

"The chief interest, therefore, of a practical character which attaches to it has reference to the great question of differential diagnosis, from the liability of its being mistaken for serious organic diseases of the vagina or uterus."

*On the Treatment of Atresia Vaginæ.**

Speaking of the menstrual retention which is dependent on atresia of the vagina, Mr. Spencer Wells dwells on the importance of making a passage for the retained fluid, and, if possible, of keeping it open, so that subsequent retention cannot occur. This, however, cannot be done without some risk. In some cases, acute pelvi-peritonitis, or pelvic-cellulitis, or uterine phlebitis, with high fever, pain, and vomiting, have followed opening of the canal, and evacuation of the fluid, and have ended in death. But there are numerous cases on record where death has occurred after a similar train of symptoms before any operation had been performed. The fluid secreted and retained distends the uterine cavity, and the canals of the Fallopian tubes, and escapes into the peritoneal cavity, either by rupture of one of the tubes, or through the open ends of the canal, or in some more indirect way it leads to a peri-uterine hæmatocele, or a pelvic abscess; a Graafian vesicle matu-rates and bursts; it is not grasped by the fimbriæ of the tube, and blood is effused into the cellular tissue between the ovary and the uterus, or there is general congestion of the venous plexuses in the neighbourhood of the uterus, and one of the veins gives way.

* "Atresia Vaginæ. Clinical Remarks at the Samaritan Hospital, January 12th, 1870." By T. Spencer Wells, F.R.C.S., Surgeon to Her Majesty's Household.

To some such danger as this any woman is daily and hourly exposed, in whom a mechanical obstruction interferes with the escape of the menstrual fluid. This obstruction Mr. Wells is of opinion ought to be removed as soon as possible.

It is the opinion of some that puncture by the rectum might be safer than opening the closed vagina—that the entrance of air and consequent putrefactive changes in the fluid not completely evacuated would be prevented by the closure of the sphincter ani, and several successful cases have been recorded where this practice has been adopted. Mr. Wells is opposed to this view. He cannot see that the intestinal gases, which would enter from the rectum into the emptied cavity, can be less injurious than atmospheric air: of the two, he would prefer the air without the fæcal gas. And then the patient is left with a closed vagina—she is simply relieved for a time from the consequences of menstrual retention. Whereas if the closed vagina be opened, the same immediate relief is afforded, and an additional service rendered which may be a permanent relief. By a little care the opened canal may be kept open, and if it should close through want of care it may be re-opened. It cannot be done without some risk, but the risk of leaving the patient alone is vastly greater.

Dr. J. A. Byrne *on Atresia Vulvæ.**

The subject of this communication was a young woman who, being about to be married, consulted Dr. Byrne.

She menstruated regularly. On examining her, he found that the two labia majora were agglutinated by a uniting medium of very dense consistence; this completely concealed all the component parts of the genital fissure. One small opening existed, through which a small probe passed; this opening gave exit to the urine and menstrual secretion. The history which she gave of this abnormality was, that when a young girl she had had fever, and that her mother had observed this change in the appearance of the genitals to occur subsequently. Dr. Byrne had her removed into Mr. Tyrrell's ward in the Mater Misericordiæ Hospital, where the septum was incised, and immediately the parts comprising the genital fissure came into view. She soon afterwards married, and was subsequently delivered of a full-grown child in the Rotunda Lying-in Hospital.

Dr. Byrne also alluded to another case which he had under

* Transactions Dublin Obstetrical Society, "Medical Press and Circular," February 1st, 1870.

observation. The woman was thirty-five years of age, she was well-formed and developed, but she never had menstruated. On examining her genitals, which appeared normal until the labia were separated, he found only a vagina, consisting of a small pouch, capable of admitting a finger point. On examining the bladder with the uterine sound, and the finger placed in the rectum, there was no trace of a uterus at all. It was evidently a case of complete congenital absence of uterus, such as had been described by Scanzoni, Raciborsky, Bernutz, and Goupil. Those writers describe this affection, and mention it as being one of extremely rare occurrence. In Dr. Byrne's case the absence of the menstrual functions, coinciding with the well-ascertained absence of a uterus, was a matter of extreme interest to the gynæcologist.

On Perimetritis and Parametritis, by J. MATTHEWS DUNCAN, *Clinical Lecturer on the Diseases of Women to the Royal Infirmary, Edinburgh*, 1869.

Dr. Matthews Duncan rejects the terms usually employed to describe the diseases he designates "parametritis and perimetritis" for various reasons, and amongst them he discards the term in most general use in this country, namely, pelvic cellulitis, a name which has the advantage at least of being adopted by Drs. McClintock and Churchill, who have both thrown so much light on this obscure subject. Dr. Matthews Duncan says:—

"Pelvic cellulitis is a name which I reject because it is new and has no recommendation. The disease described as cellulitis is often not in the cellular tissue, and it often extends beyond the pelvis. Besides there are many kinds of pelvic cellulitis which the name is not intended to imply or include . . . It is to Virchow that I am indebted for the suggestion of the chief terms I propose to use habitually. Taking example from the heart and other organs, he proposes to use *peri* to imply inflammation of serous membrane, and he uses *para* to imply inflammation of cellular or connective tissue . . . PERIMETRITIS, then, will strictly imply inflammation of the uterine peritoneum. PARAMETRITIS will imply inflammation of the cellular tissue in connection with the uterus."

In tracing the history of the disease as given by successive writers, Dr. Matthews Duncan gives a high place to a paper published so far back as the year 1843 by Dr. Doherty, then one of the assistant physicians to the Rotunda Dublin Lying-in Hospital, and at present Professor of Midwifery in the Queen's College, Galway. Dr. Doherty's paper was entitled "On Chronic Inflammation of the Uterine Appendages occurring after Parturi-

tion." Speaking of the causation of parametritis and perimetritis Dr. Matthews Duncan says:—

"It is not a metastasis of milk; it is not simply pelvic abscess; it is not simply intrapelvic abscess; it is not inflammation or abscess of the broad ligaments. It is the consequence of inflammatory or other diseases of the uterus, tubes, and ovaries. To be more incisive, it is most frequently a consequence of endometritis."

The symptoms of these diseases are thus summed up:—

"If the case be one of adhesive perimetritis, the most common of all the varieties of pelvic inflammation, there will be tenderness, fulness, hardness, occasionally the feeling of a lump or tumour; but not a real or new tumour, no feeling of fluid, no fluctuation, no considerable displacement of the uterus . . . .

"If the case be one of parametritis, there will be tenderness, fulness, hardness, sometimes the feeling of a lump or tumour, generally some displacement of the uterus."

On Sea-Tangle Tents, by Dr. J. Braxton Hicks, *Physician-Accoucheur, Guy's Hospital.*

Dr. Braxton Hicks finds that these tents distend to about three time their original diameter,and that, under ordinary circumstances, they reached their full distension in about fifteen hours. They can be applied to dilate the os and cervix uteri, as for instance in cases of traumatic closure of the os uteri and of the vagina from injury. In cases of flexion of the uterus, they may, he says, be employed to assist in straightening out the canal of the cervix, and also in cases of dysmenorrhœa and sterility from contraction of the cervix. They are also resorted to in cases where it is necessary to dilate the cervix sufficiently to examine the interior of the cervix or body of the uterus, as for instance in some cases of polypus and fibroid tumour of the uterus. These tents may be introduced by a long pair of forceps. The patient being placed on her left side, the forefinger of the left hand, or still better two fingers, if possible, are to be passed to the os uteri. The tent held by the forceps is carried along the finger to the os, into which it is introduced. The handle of the forceps should then be brought well against the perinæum, so as to throw the tent into the axis of the uterus (in cases of normal position) and very gently pressed forward; after it has passed in nearly its whole length, the forceps should be detached, and the forefinger pressed gently against the end of the tent to keep it *in situ*. In order to retain it there, it is well to pass a plug of sponge with a tape tied round it so as nearly to fill the vagina. It is well to see that the urethra is not pressed on, or re-

tention of urine might ensue, causing trouble and alarm. In multiparæ there is no trouble in employing this plan, but in some, particularly in virgins, there is much difficulty in introducing the tent, in consequence of the rigidity and drawing up of the perinæum. Another, and in my experience, a better plan, in cases where the extremely small texts are not required, is to employ an elastic catheter with a stillet. A portion of the end of the catheter not quite so long as the tent should be cut off. This will leave the stillet protruding. On this the tubular tent should be passed, care being taken to see that the stillet does not extend beyond the end of the tent. The string which is attached to the lower end of the tent being carried down by the side of the catheter, is held by the same hand. The arrangement is then introduced as an ordinary uterine sound: and when the tent is properly within the cervix, the stillet is withdrawn, thereby leaving the tent in the cervix. The finger which is in the vagina should be placed on the lower end of the tent to prevent its sliding out, and the sponge introduced as usual. A very convenient little instrument based on this principle has been made by Messrs. Weiss. There is another mode which will be convenient in some cases, namely, to pass a speculum. Having introduced the tent into the cervix as far as possible by a forceps, the speculum can be withdrawn carefully. A finger is then passed up to the tent, and gentle pressure being made, the tent slides in. This plan is good in cases where retro- or ante-flexion exists, but then of course it will be necessary, when pressing the tent in with the finger, to vary its direction either forward or backward according to the axis of the body of the uterus. In these cases the tent is ultimately placed in the transverse diameter of the vagina. In cases where the inner cervix will not permit the tent to pass I have managed to do so slowly by lodging the lower end against the fold in the posterior wall of the vagina, and then plugging that canal as usual. The little irritation produced by this has caused the levator ani to act, so that a gentle pressure is exerted for some time against the inner os, which has ultimately yielded. For the larger group of tents, it will be found that the forceps will introduce them most readily; for in most of the cases where we wish to use large tents the vagina is so well relaxed that difficulty is rare.

"It is very important in order to effective dilatation that the tent should pass the inner os in all cases where the cavity of the uterus is to be explored.

"In conclusion I may point out the special advantages of tents made of sea-weed.

"1. They can be made of any size, particularly much smaller than sponge tents.

"2. They have more distending power. The rigidity of the inner os uteri is sometimes so great that even these tents are distinctly marked by it; but the sponge tents not unfrequently are unequal to produce any marked impression on the constriction.

"3. They do not retain the secretions so as to produce so much offensiveness; consequently there is less risk of irritation locally or generally.

"4. By their greater rigidity they can be more readily applied, especially in a tortuous canal.

"They have however some disadvantages. Their rigidity makes them not so suitable in cases where the uterus is readily bleeding, or very tender; or in cases where the os is somewhat dilated by a polypus or growth distending it. Here a sponge tent is best, unless the os and cervix are very rigid. Their great distensive force makes them less acceptable where the uterus is very irritable. They should in all cases be so made that no sharp edge is noticeable. In the tubular tents this is a point liable to be overlooked. And for the dilatation of the os uteri in a natural state for purposes of induction of premature labour these tents are not by any means so suitable as the sponge tents, or as the india-rubber bags.

"With these exceptions, in cleanliness, certainty of action, ease of introduction, and minuteness, they are certainly not equalled by any other material at present in use."*

Dr. Playfair† advocates the intra-uterine treatment of obstinate cases of chronic catarrh of the womb. He believes that intra-uterine treatment in such cases is not sufficiently attended to in this country. He does not however recommend this treatment in all cases, but only in those which resist other treatment, or in which it seems probable that such a plan may assist in affecting a more speedy cure.

Dr. Playfair states, that when a profuse muco-purulent discharge issues from the os uteri, there must undoubtedly be a morbid condition of the lining membrane. This morbid condition extends up the cervical canal, and, by continuity of structure, even as far as the fundus, so that the lining membrane of the entire uterus undergoes profound alterations.

Nor are the changes limited to the mucous membrane; the underlying tissues are necessarily implicated. The cavity of the uterus and cervix become enlarged and patulous (an important point with reference to treatment), and engorgement and hypertrophy, from plastic effusion, are seldom absent. Hence the well-

* "Practitioner," August, 1869.

† "On the Treatment of Chronic Uterine Catarrh." By W. S. Playfair, M.D.

known alterations which so constantly accompany obstinate cases of uterine catarrh, such as thickening, induration, and enlargement both of the cervix and body of the uterus, and a patulous condition of the os, through which a sound can be passed with facility. If, then, in attempting the cure of such a case, we deal only with those lesions, which are more readily accessible, if we content ourselves with general hygienic means, and the cure of superficial erosions, we may produce considerable amelioration of the patient's sufferings, but we shall fail to effect a lasting cure. By rest, occasional leechings, and the more ordinary topical remedies the weight and bearing down will be greatly relieved, and the discharge temporarily diminished; but, as soon as the patient returns to her ordinary avocations, all her old troubles will come back. As long as there is any considerable amount of muco-pus issuing from the os uteri, there must be a morbid condition of the structure beyond the os, and no case can be considered cured until this has been completely stopped.

To do this, Dr. Playfair contends the disease must be attacked at its seat, and the question for us to consider is how this may be most effectually and easily accomplished.

The means by which this has been generally attempted is by the injection of fluids, such as we would apply to external erosions, into the interior of the uterine cavity. No doubt, by this means a powerful influence can be exerted on the uterine mucous membrane; but, although such injections have found many zealous supporters, they have always been regarded with suspicion by the majority of the profession, for fear of the serious consequences which have been occasionally attributed to them.

Dr. Playfair believes the plan, which he himself invariably employs, is much more simple in its mode of application, and answers every purpose. He uses several small probes, made of flexible metal, attached to a wooden handle, or fine probes of flexible whale-bone. Round these is wrapped a little film of cotton-wool, so arranged as not materially to increase the bulk of the probe. Having ascertained by examination the position of the uterus as accurately as possible, he passes an ordinary speculum. The peculiar glairy and tenacious mucus, which is characteristic in these cases, will probably be seen issuing from the os, and before making any alterative application it is necessary that this should be wiped away. If remedies are introduced without doing this, they will probably fail to touch the diseased mucous membrane, which is covered and protected by the abundant discharge. For this purpose, Dr. Playfair introduces one of the probes, bent as

nearly as possible to the direction of the uterus, covered with cotton as described, and swabs out the cavity of the cervix and uterus as completely as he can. A fresh probe, the cotton on which is saturated with the fluid which he uses, is then introduced, and on being gently moved about, the remedy is applied smoothly and evenly, but not in excess, to every part of the mucous membrane. As a rule, there is no difficulty experienced in passing the instrument.

He repeats, it is one of the peculiarities of these cases that the whole of the cervical canal is in an enlarged and patulous state. The consequence is that the probes, which should be as little bulky as possible, enter without the least difficulty, and without the employment of any force or roughness, which are to be scrupulously avoided. Dr. Playfair remarks that it is curious to observe how, as the case improves under treatment, the patulous state of the cervical canal diminishes, and more and more difficulty is experienced in passing the instrument; this he has learnt to look upon as one of the most reliable signs of improvement. Various remedies have been used for the purpose—the same as are applied to external erosions of the cervix—such as strong solution of nitrate of silver, tincture of iodine, or even the acid nitrate of mercury. Dr. Playfair uses one application only; this is carbolic acid, just sufficient water being added to the pure crystalline acid as will keep it in a fluid state, *i.e.*, about 20 parts in 100. It would be difficult to exaggerate the good effects of this application in the treatment of uterine disease. When applied to the superficial granular erosions on the cervix, it often heals them in a marvellously short space of time, one or two applications sometimes effecting a cure.*

Mr. Spencer Wells† has arranged in a table all the cases in which he has completed the operation of ovariotomy, from the 200th case included in previous papers to the 300th. In other tables he gives particulars of all his complete and exploratory operations. He finds that the mortality lessens as experience increases. Of the first 100 cases, 34 died, and 66 recovered. Of the second 100, 28 died, and 72 recovered. But of this third series of 100 cases, only 23 died, and 77 recovered.

* Remarks on the Treatment of Chronic Uterine Catarrh. By W. S. Playfair, M.D., M.R.C.P., Assistant-Obstetric Physician to King's College Hospital, etc. ("British Medical Journal," December 11th, 1869.)

† "A Third Series of One Hundred Cases of Ovariotomy, with Remarks on Tapping Ovarian Cysts." By T. Spencer Wells.

"The author has endeavoured to ascertain what influence tapping ovarian cysts may have upon the mortality of subsequent ovariotomy, and he has arranged in a table all his cases where tapping had never been done, and those in which it had been done from once to sixteen times. The general mortality of the 300 cases was 28·33 per cent. Nearly one-half of the patients, or 135, had never been tapped. In them the mortality was 27·40 per cent.—not one per cent. less than the average mortality. Rather more than one-fourth of the patients, or 78, had been tapped once. In them the mortality was 25·64 per cent. There were 19 who had been tapped three times, and the mortality was 26·32 per cent. Of the 36 who were tapped twice the mortality was exactly the same as that of the group of cases tapped from four to sixteen times,—namely 33·33 per cent.

"The author is led by these facts, and by other considerations discussed in the paper, to the following conclusions:

"1. That one or many tappings do not considerably increase the mortality of ovariotomy:

"2. That tapping may often be a useful prelude to ovariotomy, either by giving time for the general health to improve, or by lessening shock when the fluid is removed a few days or hours before removing the more solid part of an ovarian tumour; and

"3. That when the syphon-trocar is used in such a manner as to prevent escape of ovarian fluid into the peritoneal cavity, and of entrance of air into the cyst, the danger of tapping is very small.

"Dr. West agreed with Mr. Wells, that the idea of tapping being attended by great danger was erroneous. Preliminary tapping was often of great service as an aid to diagnosis. The operation was seldom hazardous; and, when patients died after tapping, they could not often be said to have died in consequence of it. He regarded ovariotomy as a splendid operation, doing that which physicians were unable to effect. In saying this, he felt himself in the position of one who had to recant a former belief; and, while at one period he had condemned ovariotomy, he could now the more justly raise his voice against attempts to decry it. He asked whether any one was still in the habit of employing iodine injections—a practice from which much was once hoped, and which perhaps might have been carried out with more perseverance than it had been.

"Mr. Spencer Wells, in reply to Dr. West, said that he had lately conversed with M. Nélaton and M. Boinet, who had both large experience in the treatment of ovarian cysts by iodine injections, and he found that they had both arrived at the same conclusions as his own experience of seven cases would lead to. Of his own seven cases, only one patient was alive who had not since undergone ovariotomy. This one was still in tolerable comfort nearly ten years after the injection; but rather a large cyst could still be felt. If a cyst was unilocular, with thin walls and limpid contents, then, after tapping and injecting iodine, a radical cure occasionally followed. But it was very doubtful whether iodine had much or anything to do with the cure, because tapping alone, without the use of iodine, in this form of cyst was also occasionally completely

successful. No more fluid was secreted, the cyst collapsed, its walls probably coalesced, and after a time no trace of it could be detected by the most careful examination. When the contents of a cyst are viscid, iodine is quite useless. In such cysts, and in multilocular cysts generally, injections of iodine should be restricted to cases where, for some reason, ovariotomy cannot be performed, but where a cure may be hoped for after suppuration and drainage. Here washing out the cavity, once or twice a day, or oftener, with plenty of iodine in solution, becomes very useful, by deodorising the offensive secretions, and probably by preventing absorption of putrid fluid and blood-poisoning.*

MR. SPENCER WELLS *on the Introduction of the Clamp in Ovariotomy.*

The credit of the introduction of the clamp in this operation says Mr. Spencer Wells, is due to Mr. Hutchinson, surgeon to the London Hospital. He first used one in 1858. It was simply the common calliper of carpenters, which he used and left applied, handles and all. Then the handles were made movable, so that they could be taken off as soon as the clamp was fixed. Mr. Wells then made the blades parallel, and did without handles. But he afterwards returned towards the original form of clamp, altering the joint and the form of the opposing surfaces of the clamp until he arrived at that which he now uses. Since October last he has completed the operation of ovariotomy in 36 cases. Of the 36 women, 31 recovered and 5 died; and it is a remarkable fact that in *every case* in which the pellicle was long enough for him to use the clamp the patient recovered.

For a week or two previous to the operation for fibrous tumour of the uterus, Dr. Palfrey† regulates the condition of the patient's bowels, and some three or four days before the commencement of the ensuing menstrual period, has the os uteri leeched.

During the whole of that period he advises the patient to remain quietly in bed, and as the decline of the menstruation is indicated, he again applies four or six leeches to the cervical portion of the uterus, this time followed by a warm bath. On the morning of the third day from the entire cessation of all bleeding, he administers a gentle purge; and having thus reduced to a minimum the congestion of the uterus, he proceeds on the morning of the fourth day to operate. He says 'on the morning of the fourth day; because he has found in performing any operations upon the sexual organs, that by operating early in the day, the patient not only

* Royal Medical and Chirurgical Society, 1869.

† "The Treatment of Fibrous Tumours of the Uterus." By James Palfrey, M.D.

recovers from any sickness or other inconvenience that may follow the administration of chloroform, but also regains before night that mental quiet which every woman loses when aware she has to undergo any surgical proceeding, no matter how simple, so that, as a rule, their night's rest is not at all interfered with. Early, then, he has the patient placed upon a firm table—none better than an ordinary narrow dressing table, and being thoroughly under the influence of chloroform, he has her brought well to the edge of the table, and in the lithotomy position, an assistant taking charge of a knee on either side, which must, during the whole time, be kept well flexed upon the abdomen. He next introduces a Sim's speculum, one of large size, fixed upon a straight handle, which gives greater power in depressing the perinæum than the ordinary double-bladed duck-bill speculum. Having brought the os uteri well into view, he gives the speculum into the charge of a nurse, who is instructed to kneel at the left of the operator, being prepared with six or eight small fine sponges, attached to long slender handles of cane; with a pair of fine slightly curved vulsellum forceps he then grasps the anterior lip of the uterus, giving the handles of the vulsellum into the charge of one of the gentlemen commanding the knees. He next introduces *into* and *through* the os uteri internum Sir James Simpson's hysterotome, having previously adapted the blade to the identical depth he wishes to cut on either side, with this instrument he makes a bold and free incision, first into one side of the cervix, then into the other.

Dr. Palfrey particularly observes that this portion of the proceeding differs very considerably from the operation that is performed for the relief of those cases of dysmenorrhœa, depending upon a narrowing or other mechanical obstruction in the cervical canal; in those cases he cuts *up to*, but *not into* the os uteri internum. Completing the incisions of the cervix, he pauses for a moment, for it is at this stage, if at all, he gets some free bleeding, and should this happen, he sponges the cervix well over with small sponges dipped in ice water, and in a few moments, the bleeding as a rule, ceases. Dr. Palfrey states that the bleeding has, on only one occasion, given him the slightest anxiety, and in that case he ought never to have operated, for he subsequently discovered that the patient was the subject of old Bright's disease; and this case he mentions as the only fatal one that has occurred to him in 119 operations.

The next step is to cut into the growth itself, still preserving the steadiness of the uterus with the forceps in the anterior lip. He next passes into the uterus a very long probe-pointed knife, or

rather saw, as it is more like a miniature saw than anything else he can name; this instrument he introduces sideways, guided as far as possible by his finger, wholly into the uterus; then, according to the position of the growth, either in the anterior or posterior wall, he turns its serrated edge towards the surface of the tumour, and with a slow, yet firm and decided movement, he cuts his way into the growth; and assuming, for the sake of description, the growth is in the posterior wall, he introduces the index-finger of his left hand into the rectum, and supporting the enlarged uterus in this way, he cuts slowly and deeply, until the depth of the knife in the growth and its distance from the surface of his finger in the rectum, lead him to believe that he had made an opening through the greater part of the diameter of the tumour, then turning this saw-like knife with its edge to the right, he makes a lateral cut in that direction, and subsequently doing the same into the left portion of the growth. This part of the operation he has never seen attended or followed by any notable bleeding. This finished, he introduces into the vertical jagged incision in the tumour one or more narrow strips of lint, well wrung out in olive oil. This step in the operation requires some management, and at first gives some little trouble. He then plugs the whole of the incision, and also the cervix; he follows this by plugging the whole vagina with balls of cotton wool, tied at small distances to a length of whip-cord. This form of plug possesses the great advantage of being instantly removed at pleasure, and, in addition, he avoids the pain and discomfort which attends the use of separate strips of lint, or other material, which, if closely packed, as they ought to be, into the vagina, cause some trouble and considerable pain in their removal.

Having securely plugged up the vulva with this continuous plug of cotton wool, soaked and wrung out in oil, a thick pad of folded lint upon the external organs, secured by a tightly applied T bandage, completes the operation. The patient is now removed to bed, and a third or half a grain of morphia is administered by the hypodermic syringe. Should any sickness follow, he avoids giving anything for a few hours by the mouth, save now and then a table-spoonful of iced milk, or a little lemon-water ice, which is usually kept down and much liked by the patient. As soon as all fear of vomiting is over, Dr. Palfrey gives some light nourishment, followed, if necessary, by a little champagne, or other light wine. As a rule, the pain following this operation is not sufficient to demand the regular administration of opium, or any other sedative, and he has long discontinued its use in these cases, unless

called for by special circumstances. Towards evening or earlier, should the patient complain of distension, the bladder must be emptied by the catheter, and this method of relief must be continued until the whole of the vaginal and cervical plug has been removed. Should no outward circumstance contra-indicate this course, he removes the vaginal portion of the plug twenty-seven or thirty hours after the operation, and the vagina is then very gently washed out with a tepid douche. At the expiration of forty-eight hours, he removes the cervical and uterine strips of lint, and then, having again washed out the vagina and lower segment of the uterus, he replugs the cervix and as much of the uterus as possible in the same manner as at first, removing the lint and replacing it every morning. This process is attended with a considerable discharge of an offensive odour, which Dr. Palfrey believes to proceed from the softening and breaking down which is going on in the interior of the growth through the capsule, into the centre of which the opening was made.

Continuing the treatment in this way, a sensible diminution in the size of the whole organ will be noticed, more especially, however, in that portion of the uterus in which the growth was developed, the organ will become less fixed and more movable. Dr. Palfrey continues to use the cervical plug until four days before the next menstrual period comes round, and then he allows the uterus a few days of perfect quiet.*

Speaking of the cases of women who have difficult and painful menstrual periods, accompanied with neuralgic pain and depression of spirits, Dr. Ainstie† says:—

"If ever there was a case in which the physician may make himself, in the most tragic sense, the evil genius of his patient, it is this. The woman has pain, or spasm, or both, and the doctor tells her that brandy will relieve these symptoms, which is true enough. It is also true that if the brandy could be administered strictly as a medicine, regulated to the minimum dose which was necessary, no harm would be done, though no permanent cure could be expected. But if it be left to the patient herself to settle the dose, there is the greatest danger that she will exceed the necessary quantity, and, instead of taking a moderate stimulant dose, which would relieve pain without narcotising, will take a quantity which produces semi-intoxication. There is no more dangerous trial for a female, who is subject to these periodic attacks

* "The Medical Press and Circular," July 14, 1869.

† "On the Abuse of Stimulants in the Treatment of Dysmenorrhœa." By Dr. Francis E. Ainstie, Senior Assistant-Physician, Westminster Hospital.

of pain and depression, than that first experience of alcoholic narcotism. In such circumstances, it is a melancholy fact, that the *oblivion* of slight drunkenness is most seductive; and that the chances are great that, on the occurrence of the same symptoms, the patient will long, with increasing eagerness, on each successive occasion, for the same luxurious stupefaction. Let no one imagine that this warning is the expression of fears based on mere imagination; my own experience has supplied only too many instances of the reality of the danger, and inquiry among physicians whose practice in nervous disease is large has added greatly to the strength of my convictions. I have for a long time made it a rule *never* to recommend, or even allow, a patient subject to ovarian neuralgia, to take alcohol at all, except in the ordinary quantities *with meals*. Pain and nervous depression is best quieted with small subcutaneous injections of morphia, or, still better, of atropia. It is a very bad precedent to allow a woman to take alcohol for the mere momentary relief of pain or depression."*

Mr. Clay, of Birmingham, recommends an india-rubber pessary in flexions of the uterus. This instrument is a small, almost inelastic ball, attached to an ordinary elastic pessary, and so arranged that its axis forms an obtuse angle with that of the larger part of the pessary. It is equally applicable in cases of retroflexion, and in cases of antiflexion. For an antiflexion of the uterus it is introduced in the following manner:—The instrument is dipped in tepid water, and its upper surface then smeared with a solution of gum arabic to facilitate its introduction. I have used a solution of gum arabic for this purpose for some time, and find it to be a very good substitute for oleaginous and fatty matters, which dissolve the india-rubber, and destroy the integrity of the instrument. The pessary is now rolled up on its long axis, and passed under the pubes, along the anterior wall of the vagina, until the upper part is passed beyond the os uteri. The pessary is then inflated, which forces the small portion of the pessary into its place, that is, between the uterus and bladder, restoring the uterus to its normal position. When the pessary is sufficiently filled with air, the tube is made secure, and suspended to a band round the wrist, or placed in some other convenient position. The pessary must be introduced with the small ball looking towards the uterus, for if it is passed in the opposite direction, the upper extremity would press on the bladder, and the lower portion would exert undue pressure on the uterus. The inflations of the pessary may be effected either by the mouth, or by means of Higgison's syringe, the two being connected by a small piece of india-rubber tubing. For retroflexions

* "The Practitioner," July, 1869.

of the uterus it is only necessary to pass the pessary along the posterior wall of the vagina—reversing, in short, the introduction of the pessary in cases of antiflexions. The pessary was constructed, under Mr. Clay's directions, by Messrs. Salt, of Birmingham.*

1. *The Cure of Nævi by the Injection of Carbolic Acid.*—Mr. George Porter, Surgeon to the Queen in Ireland, and Surgeon to the Meath Hospital, exhibited to his class a girl, aged ten months, who was admitted into the hospital, suffering from a large nævus, of a venous character; it was as large as half-a-crown, circular in form, and situated on the lower part of the forehead, immediately above the nose. Mr. Porter injected two minims of pure carbolic acid by means of a hypodermic syringe into the nævus. When the inflammation which followed this operation had subsided, after an interval of some days, this injection was repeated in the same manner on seven different occasions. After the seventh operation the venous tumour had become solidified, and would, in due time, be absorbed.†

2. *The use of Caustics in Cases of Nævi.* By T. Holmes, Esq., F.R.C.S., Surgeon to St. George's Hospital. In the last edition of Mr. Holmes's treatise on the surgical diseases of infancy and childhood, we find the following observations on the employment of caustics in the treatment of nævi:—

"The use of the actual or potential cautery in nævus," says Mr. Holmes, "is very succesful. I have repeatedly treated small nævi, in exposed situations, by passing a needle, heated to a white heat in the blow-pipe flame, into their tissue at various points, and I think this is a very good way of treating those which are too thick to be dealt with by the use of the potential cautery; for the latter penetrates only a very short distance at each application. But for nævi which are very superficial, no treatment, I think, answers so well as the repeated application of strong nitric acid. It should be applied carefully to the whole surface of the nævus, but not to the healthy skin around it, which may be defended with a layer of oil. The application of the acid substitutes a yellowish-white colour for the red of the nævus, and when the cure is complete it leaves a very slight depression of nearly the natural colour. It may require several applications, but rarely fails to cure nævi which are merely cutaneous. The application of potasa fusa will answer the same purpose, and, as it penetrates deeper than the

* "Lancet," September 25th, 1869.

† "Medical Press and Circular," August 18th, 1869.

nitric acid, it is more applicable to the treatment of thicker nævi; but it is much more painful, and leaves a more evident scar. These two substances answer their purpose so well that I have not found it necessary to use any other of the potential cauteries."

For the palliative treatment of extroversion, or congenital hiatus of the bladder, consisting of a deficiency of the anterior portion of the bladder, and of the parieties of the abdomen which should form its covering, Mr. Holmes* recommends, and has very successfully practised, the following operation. If covered with hair, the parts are first to be carefully shaved. Then he marks out in one groin a square flap, large enough to completely cover the cleft, and dissects it up towards the cleft, with its base at the edge of the cleft, and turned over like the leaf of a book, so that it may present its cutaneous surface to the cleft, which it then completely conceals. Next, in order to fix this flap, he takes a second from the opposite side of the scrotum, running obliquely down from the edge of the cleft. This having been dissected up as far as necessary, is gently twisted round so as to lie over the cleft in the reverse position to the former, viz., in its natural aspect, with the skin surface outwards. Thus the raw surfaces of the two flaps will be in contact, the flaps being so cut that their edges fit throughout their whole extent. He then unites the edges by numerous points of silver suture. The exposed surface of the scrotum may be narrowed, and in some cases closed, by drawing together its edges with stout sutures. The gap also in the groin may be somewhat reduced. A good deal of exposed surface must be left to fill up by granulations. The exposed surfaces as well as the edges of the flaps being bathed continually in the urine which escapes above and below the bridge of skin thrown over the cleft, it is clear that the process of healing will be slow. No dressing can be used. In the first case Mr. Holmes treated in this manner, he made an attempt to keep the urine from contact with the flaps by means of a kind of shield, or bridge, which he interposed between the flaps and the mucous surface; but it seemed to create so much irritation, and to be so uncertain of obtaining the desired result, that he abandoned it, and has not found that the presence of the urine is any serious bar to the union of the flaps.

Mr. Holmes has operated in this manner five times, and has found the operation succeed in three of the cases. After a bridge of skin

* "The Surgical Treatment of Diseases of Infancy and Childhood." By T. Holmes, M.A., etc. Second Edition. London, 1869.

has thus been formed, covering the herniated mucous membrane of the bladder, its upper edge is to be implanted into the skin of the abdomen by refreshing the contiguous edges and uniting them with the twisted suture. Mr. Holmes is of opinion that it is better to defer this part of the treatment till after the bridge has been formed. If the attempt be made to implant the bridge into the skin of the abdomen at the same time as the flaps are transplanted, the operation will probably not succeed as far as the union of the upper edge of the transplanted flaps with the abdomen is concerned, and the success of the entire process is endangered. Several partial operations even will often be advantageously substituted for any attempt to implant the whole upper edge into the skin of the abdomen. When the whole has been completed, there remains only an opening (perhaps large enough to admit the middle finger), just above the rudimentary penis, leading into what is now the cavity of the bladder. This can easily be defended by an ordinary railway female urinal, and thus the patient will be relieved from the bleeding consequent on the herniated condition of the mucous membrane, and from the urinous smell and excoriation of the parts, which are the consequences of the difficulty of fitting an instrument on to so large and so irritable a surface as the extroverted bladder. The new cavity is often large enough to hold the water for a short time.

Mr. Holmes does not claim to have effected more than what is above described, though he is confident that a more extended experience of these cases would enable us to afford more effectual relief. Mr. Holmes is of opinion that the comfort which the above-described operation affords is quite sufficient to justify the trifling risk of its performance and the inevitable tediousness of the process, involving as it does several plastic operations.

The mechanical treatment of incontinence of urine in childhood and youth, to which Sir Dominick Corrigan calls attention,* is the treatment by collodion. It is most easy of application, occupies scarcely a minute, and can be carried out at school, college, or elsewhere, in perfect privacy. All that is necessary is, while the prepuce, slightly curved up, is held with the hand, to smear over the little cup thus formed by the extremity of the prepuce with collodion by means of a small camel's-hair pencil, or the blunt end of a penholder. Almost as fast as applied the col-

* "Dublin Quarterly Journal of Medical Science," February, 1870.

lodion solidifies. In contracting it draws closely together the edges of the prepuce, and thus the exit for the escaping urine is closed.

A boy of eleven years of age has, after one lesson, been able to use the collodion, and has used it every night carefully and diligently, so anxious has he been to cure himself of what he considered a disgrace.

A fortnight's use is sometimes sufficient for the cure. A relapse is easily dealt with. A solution of gutta-percha in chloroform would seem at first sight to be equally applicable, but it is not. The solution of gutta-percha is much longer in hardening, and it possesses no contractile powers.

When the child or youth desires to pass water, the little wedge or cap of collodion is easily removed with the finger nail.

Sir Dominick Corrigan is of opinion that the action of the muscular contractile fibres of the bladder has little to do in causing the nocturnal incontinence of urine in childhood, and that the escape of the fluid is rather due to want of opposition in the sides of the canal of the urethra, or to a feeble state of the circular fibres which are supposed to constitute the sphincter of the neck of the bladder.

Acting on this view, he recommended the child's bed to be made in such form as that while preserving the usual slope for head and shoulders, the rest of the bed shall gently rise as an inclined plane from hips to feet, so as to allow the urine in the bladder to gravitate towards the fundus, rather than towards the trigone.

In a short work on whooping-cough,* Dr. Martyn ascribes its frequent occurrence in early youth to the anatomical peculiarities of the larynx and glottis at that period. He gives an illustration of the larynx in the infant at nine months, which he shows to be only three lines long. The minute size of the glottis in infancy makes the aggravation of the disease, says Dr. Martyn, its essence being inflammation of the top of the trachea. He believes that spasm has little to do with whooping-cough. He also holds that the disease is not infectious, nor occurs beyond the age of puberty and the enlargement of the larynx at that period. The treatment Dr. Martyn recommends is directed to the inflammatory condition, which he regards as the essence of the disease, and has for its object the thinning of the glutinous secretion

* "On the Pathology and Treatment of Hooping-Cough." By Patrick Martyn, M.D.

and helping its expulsion, at the same time supporting the system of the little patient and that of its nurse.

Materia Medica and Therapeutics. *By* Adolphe Wahltuch, M.D., *etc.* (*of Manchester*).

Aquapuncture in Muscular Pain.—Dr. Malléz* tried successfully this new form of revulsion in severe sacro-lumbar muscular pain, also in rachalgia accompanying prostatic enlargement, and in other cases of sympathetic muscular pain. Aquapuncture is performed in the following manner: Attached to a forcing pump is a leaden pipe with a filiform adjustment at its extremity; pressure on the lever of the pump causes the penetration under the skin, through a capillary puncture, of some grammes of water, which distend the subcutaneous cellular tissue, forming a small whitish spot. The first penetration of the cutis causes a sharpish pain; but this soon ceases, and in twenty minutes the effused water disappears, leaving only the traces of a mere puncture.

Atropia.—Dr. Nunneley† concludes from experiments lately made by him that the action of atropia on the heart is neither considerable nor energetic, a progressive weakening of its power being the most prominent visible effect.

Bichloride of Mercury.—Dr. Th. J. Walker‡ advocates the subcutaneous application of bichloride of mercury in secondary syphilis. He uses a solution of 5 grains in 250 minims of water and 250 minims of glycerine, and injects 10 minims, or $\frac{1}{10}$ grain. The injection frequently causes inflammation and exudation at the seat of puncture, which usually disappears in a few days. The injections are made in the cellular tissue of the arm or thigh, or over the abdomen. The result of this treatment in ten cases encourages a further trial.

Bichloride of Methylene.—Ph. Miall§ gives an account of a hundred cases of the use of bichloride of methylene as an anæsthetic, and concludes—1. It is a safe anæsthetic; 2. It is important to exclude

* "Medical Times and Gazette," November, 1869.

† "British Medical Journal," November, 1869.

‡ Ibid., July and December, 1869.

§ Ibid., January, 1870.

rather than to admit air during its administration; 3. In smaller operations it is decidedly preferable to chloroform, and for larger ones quite as useful.

Bromide of Iodine.—Dr. Gerould,* of Ohio, exhibited this compound at the April meeting of the Gynæcological Society of Boston. In cold weather it has about the consistence of confection of roses; when warmed it becomes liquid. It is used as a topical application in chronic endometritis, in enlarged, congested, or flabby condition of the cervix uteri, and for tumours, whenever accessible, in the form of one part of bromide of iodine to six parts of glycerine. He further uses this drug for bronchial affections in the form of spray with the steam atomizer.

Bromide of Potassium.—Dr. Hughlings Jackson† finds the combination of 10-15 m. of the tincture of digitalis with this salt to be of more value in many cases of epilepsy than the bromide alone.

Dr. J. G. Porter‡ advocates the combination of the bromide of potassium with the sulphate of morphia in the perilous stage of typhus or typhoid fever; the first in 20 grain doses, and the latter in $\frac{1}{8}$ grain doses in solution, given at intervals of three hours.

Chloral Hydrate.—Richardson's§ experiments with chloral lead to the following results:—1. Chloral is decomposed by the alkalies of the blood, and gives off chloroform and forms formate of soda with the blood. 2. Two parts of chloral hydrate are equivalent in physiological value to seven of chloroform. 3. Deep and prolonged narcotism can be safely produced by the hydrate of chloral. 4. In the transition from drowsiness to stupor there is no stage of muscular excitement. 5. There is always muscular relaxation, extending to the muscles of volition, and also to the iris and muscular arterial system. 6. Therapeutically it is to be accepted as the rival of opium. 7. It will be of essential use in tetanus. 8. The dose for a child is 7 grains; for an adult, the dose may be extended to 120 grains.

The conclusions derived from therapeutical enquiries made by the physicians and surgeons of the Edinburgh Royal Infirmary‖ seem to favour the very general opinion that the hydrate of chloral is perhaps the purest hypnotic and sedative we possess; its admi-

* "British Medical Journal," March, 1870. † Ibid., January, 1870.
‡ "Medical Press and Circular," November, 1869.
§ "British Medical Journal," August and October, 1869.
‖ Ibid., April, 1870.

nistration being followed, in most cases, by beneficial results, and comparatively rarely by injurious effects; also that for these purposes it may be given with advantage in all cases where sleep is abnormally absent, and in diseases or injuries where any excitement or irritation of the nervous system exists.

Dr. Demarquay's* conclusions from experiments made with chloral hydrate are:—1. It is a powerful agent for muscular relaxation. 2. It is the most rapid hypnotic. 3. The hypnotic action is especially powerful in feeble individuals. 4. The duration of this effect is in direct ratio to this feebleness. 5. It is safe in large doses, so much as 5 grammes having been administered without any dangerous effects.

The latest experiments of Liebreich† reveal the following facts:—1. The action of chloral and strychnia interfere with one another. 2. Strychnia proves an antidote in cases of chloral-poisoning. 3. Chloral is no antidote in cases of strychnia poisoning, on account of the action of strychnia being too rapid.

Dr. Russell Reynolds‡ finds nourishment, and especially the white of egg, very serviceable in cases of dangerous symptoms arising from an overdose of chloral.

Dr. Russell gives in a pamphlet§ the results of the employment of chloral hydrate in twenty-one cases of typhus. The following passages are specially to be noted:—

"Seeing that the delirium in typhus depends on the presence of impurities in the blood, the elimination of which is a process requiring time, all that we can expect from a sedative, which does not act by hastening elimination, is to soothe from time to time, and to check vital exhaustion until the process is completed by the natural channels. In this aspect the chloral appears in no case to better advantage." (Page 8).

"It is the almost perfect analogue between natural sleep, and the sleep induced by chloral, in properly adjusted cases, which commends that drug to my mind as the best hypnotic in febrile diseases." (Page 11.)

"Forty grains is a toxic dose; it produced depression and irregularity of the heart's action. In my cases, all the benefits without the dangers of chloral were obtained with twenty grains' doses for adults, two grains for an infant of eighteen months, three grains for two of three years, and ten grains for children of nine and fourteen years. If not sufficiently diluted, the medicine is vomited; when sufficiently diluted it may be borne by the most irritable stomach, as it was in Case X., in which nutrient enemata

* "Union Médicale," September, 1869.

† "Medical Times and Gazette," December, 1869. ‡ Ibid., 1870.

§ "Clinical Observations on Hydrate of Chloral as a Hypnotic in Typhus." By James B. Russell, M.D., Glasgow, 1870.

were required from obstinate vomiting, and yet the chloral was not rejected." (Page 14.)

"'It is impossible not to feel a genuine admiration for the stroke of genius which is indicated in the prediction from purely chemical considerations, that chloral would yield up chloroform to the blood in precisely the way in which it might be expected to do the maximum of good, and the minimum of mischief,' are the words of a recent reviewer. The illustration of the theory furnished by the rapid and magical effects of chloral in typhus, involves an idea even more attractive. We transform a pathological into a therapeutical process. The fever products liberate the soothing agent, and so calm the excitement which they themselves have made." (Page 16.)

Conium, Opium, Belladonna, and Hyoscyamus.—The results of Dr. J. Harley's experiments * may be summed up:—

1. Hemlock has the power of resolving nervous action into its chief constituents, and leaving untouched the one portion (the sensory), suddenly paralyses the other (the motor). In the treatment of nervous diseases, it should be given only when irritation, direct or reflex, of the motor centres is present. The best preparation he considers to be the succus conii (prepared from plants just coming into bloom) from 2—8 drachms as a dose for adults, and from 1—2 drachms for infants.

2. Opium and morphia act on individuals in a twofold manner; (*a*), some are readily influenced by the hypnotic action and suffer little or no inconvenience from its excitant action on the brain or its depressant action on the vagus; (*b*), some are depressed by these drugs to such a degree that the hypnotic action is altogether counteracted until it has passed away. In persons of the latter class these substances ought to be administered with caution. Narceine, he considers, a useless medicine; it frequently produces retention and suppression of urine. Meconine applied hypodermatically in doses of 1—2 grains for adults, and ½ grain for children, will generally be found effectual in its soporific action. With regard to the action of the different alkaloids of opium, two distinct effects should be noticed—a soporific and an excitant. In morphia these effects are more or less equally associated, according to the constitution of the patient. In narceine and meconine no excitant action is observed. In cryptopia and in thebaia, the hypnotic is almost completely hidden by the excitant action. Codeia occupies a mid-place between morphia and thebaia, being stronger than morphia and weaker than thebaia as an excitant, while as a hypnotic the relations are reversed.

* "The old vegetable narcotics," by J. Harley, M.D., London, 1869.

3. Belladonna must be regarded; (*a*), as a powerful stimulant to the sympathetic nervous system, or in other words, to the heart and bloodvessels; (*b*), as a potent diuretic; (*c*), as an oxidising agent (by its direct action on the nerve-centres and stimulating effect on circulation); (*d*), as possessing anodyne and hypnotic properties; (*e*), as a most valuable antispasmodic. He prefers the subcutaneous application, and uses the sulphate of atropia from $\frac{1}{100}$—$\frac{1}{32}$ of a grain for each injection.

4. Henbane seems to resemble belladonna in its action, having, however, a more powerful effect on the cerebrum and motor centres and acting less on the sympathetic.

Digitalis leaves.—Dr. Russell Reynolds mentions a case in which the applications of hot poultices made of digitalis leaves produced a copious secretion of urine.*

Electricity.—The following passages in Dr. Althaus's second edition of his excellent work† on electricity are of special interest:—

"Electricity or galvanism is not a single thing; there are four different forms of it, each of which possesses peculiarities of its own which distinguish it from its fellows; while from one of them, viz., the continuous current, again, three radically different effects may be obtained, according as we use its catalytic, electrolytic or cauterising action" (p. 426). "I have had in the course of practice, somewhat frequent opportunities of observing the beneficial influence of the continuous current, in cases where in consequence of impaired cerebral nutrition, mental symptoms had made their appearance" (p. 437). "In certain forms of epilepsy which resist other modes of treatment, the continuous galvanic current may do a great deal of good" (p. 515). "Photophobia often resists the ordinary treatment, but yields readily to the continuous current" (p. 562). "Want of erectile power is a frequent cause of impotency, and curable by faradisation of the ischio-cavernosus and bulbo-cavernosus muscles, which preside over erection" (p. 620). "I have had a few cases of chronic metritis under my care, in which the results have been so satisfactory, that I feel justified in recommending a more extended use of faradisation to obstetric physicians" (p. 628). "The electrolytic treatment appears to be the most universally applicable method of electrisation for the cure of tumours, although it is not nearly so rapid as the galvanic cautery, especially where the tumours are large. Its

* I have tried the foxglove-leaf poultice in a case of ascites with scanty urinary secretions, and this treatment has been very successful, for a copious secretion of urine followed, and the water in the abdomen disappeared.—A. Wahltuch.

"Lancet," and "Union Médicale," April, 1870.

† "Treatise on Medical Electricity," by J. Althaus, M.D. Second Edition. London, 1870.

effects are essentially slow in all tumours except in those with serous contents, and it tends rather to a profound modification of the nutrition of the parts involved, than to a sudden destruction of the morbid growths. Electrolysis has hitherto proved chiefly successful in nævus, bronchocele,* sebaceous tumours, hydatid tumours of the liver, and in cancer. In the solid variety of tumours a more powerful current is required than in the cystic, viz., 30—40 cells instead of 10—15" (pp. 639—645).

Methyl and allied series.—Dr. B. W. Richardson† puts the physiological action of the methyl and allied series side by side with their chemical constitution. He groups these substances under five heads—the nitrites, the hydrides, the alcohols, the chlorides, and the iodides. He shows that the nitrites act chiefly and always primarily on the sympathetic nervous system; and that the hydrides are negative substances, insoluble in blood, unirritating, but in many minor applications of medicine, of great service. He holds the alcohols to be strictly anæsthetic substances; the chlorides simple anæsthetics, and the iodides to produce at one and the same time general insensibility and increased secretion from glandular structures. In regard to all, from the methyl to the amyl series, their action on animal bodies is invariably attended with decrease of temperature, and the effect in all cases is more determinate, as the weight of the substance is increased by increase of carbon. For therapeutic use he specially recommends the hydride of amyl, the iodide of butyl, and the chloride of amyl.

Mercury, Podophyllum, and Taraxacum.—Experiments made with these drugs on dogs, by the Edinburgh Commissioners of the British Medical Association, show negative results as to their supposed cholagogue action; they do not increase the biliary secretion, and in doses producing purgation, the solid and fluid constituents of the bile become diminished. But diarrhœa from many other causes besides aperients, is always accompanied by a diminution of the biliary secretion, hence the action of the above drugs on the bile is negative.‡

Nitrite of Amyl.—Before the Clinical Society of London.—Drs. B. Sanderson and Anstie communicated cases of angina pectoris,

* "In a very obstinate case of bronchocele of eight years' standing, where all other remedies failed, I tried electrolysis with the most surprising success; I also obtained good results by using the electrolytic treatment in several cases of warts and small sebaceous tumours."—A. WAHLTUCH.

† "Medical Times and Gazette," August, 1869.

‡ "Dublin Quarterly Journal of Medical Science," August—November, 1869.

relieved by the inhalation of nitrite of amyl. The physiological researches lately made by Dr. Brunton, in Professor Ludwig's laboratory, showed: 1. The effect of nitrite of amyl is to diminish arterial pressure; 2. It does not diminish the work done by the heart in a given time, although it increases the frequency of its contractions. 3. It does not exercise its influence on the nervous system, but on the contractile walls of the blood-vessels, reducing the arterial pressure by diminishing the resistance to the circulation.* The inhalations of nitrite of amyl have been successfully tried by Dr. Anstie in a case of asthma and facial neuralgia, and by Dr. Forster in a case of traumatic tetanus.†

Quinine.—Dr. Garraway relates a case of a lady who, each time after a dose of one grain of quinine, had been suddenly seized with œdema of the face and limbs, accompanied by an erythematous rash.‡ Similar cases illustrative of the occasional idiosyncratic intolerance of quinine have been observed by Hemming and by Thorowgood; § also by Lightfoot and by Skinner.‖ In the "New Orleans Journal of Medicine," two cases are related, in which the administration of quinine was invariably followed by urinary hæmorrhage.¶ The "Indian Medical Gazette" says, that subcutaneous injections of quinine, in five grain doses, have been successfully practised in the malarious fevers of Bengal for several years.**

Quinovate of Lime.—This salt is now largely prepared in England; it is said to possess valuable tonic properties; the dose is 2—8 grains given frequently as a powder or in mixture.††

Sulpho-carbolates.—In a paper read before the Obstetrical Society of London, Dr. Sansom gave a detailed account of the use of these salts in diseases of children. When equivalents of carbolic and sulphuric acid are mixed, a new acid—sulpho-carbolic acid—results, which unites with basic oxides of the metals, to form stable and soluble salts. He used the sulpho-carbolate of sodium successfully in the treatment of sloughing sore throats, malignant scarlatina and quinsy; and gave the sulpho-carbolate of calcium with good

* "British Medical Journal," February, 1870.
† "Lancet," April, 1870. "Union Medicale," June, 1870.
‡ "British Medical Journal," October, 1869.
§ Ibid, November and December, 1869. ‖ Ibid, January, 1870.
¶ Ibid, January, 1870. ** Ibid, February, 1870. †† Ibid., March, 1870.

effect in rickets and in diarrhœa of tubercular children. The dose of the sulpho-carbolate of sodium as well as that of calcium, in children is from 3—5 grains and upwards.*

Sulphurous Acid.—Dr. R. Bird noticed that the temperature becomes reduced after the administration of sulphurous acid continued over 24 hours. He gives one drachm every two to four hours; the greater the heat the more frequent the dose. He found it to be very valuable in remittent fever.†

PHARMACY. *Report by* P. W. SQUIRE, *Member of the Pharmaceutical Society of Great Britain, Chemist on the establishment of the Queen.*

Of the services rendered by chemistry to medicine during the past year, by far the most important has been the production of hydrate of chloral on the large scale for internal use. The manufacture of this substance has attained gigantic proportions, some factories turning out as much as one or two hundredweight a day. Many papers have appeared treating of the use and effects of this body, and abstracts of them will be found in other parts of this work. I have confined myself here to some which relate to the impurities and special peculiarities of the preparation, and to the characters which serve to distinguish the product best fitted for medicinal use. Among the other new preparations which have been introduced, various compounds of iron figure as usual very prominently. The choice now open to the practitioner of the preparations of this metal must be rather perplexing. This year, however, a class of ferruginous compounds has been brought into notice, which seem really deserving of attention. It appears that the pure peroxide of iron is capable of far greater solubility under certain circumstances than was hitherto suspected, and that by means of the beautiful process of dialysis discovered by Graham; and even by very careful direct preparation of a pure (or very nearly pure) peroxide of iron a ferruginous solution may be obtained almost free from astringency, but possessing all the tonic properties of the metal. Numerous other observations of less importance relating to the progress of pharmacy will be found below, but I have thought it well to call special attention to those I have mentioned as standing out prominently in the annals of the pharmaceutical year.

* "British Medical Journal," January, 1870.

† "Indian Medical Gazette," 1869; "Practitioner," 1869.

Alcoholate of Chloral.—The alcoholate of chloral, obtained by the process of M. Roussin,* melts at a temperature a little above the fusing point of the hydrate; its boiling point is about 113·5° Cent. that of the hydrate being about 97° Cent.; its density is 1·34, that of the hydrate being 1·57. Its appearance also differs from the hydrate, the alcoholate being composed of translucent crystals, which do not abstract moisture; while the hydrate is deliquescent and has the appearance of loaf sugar. The alcoholate contains only 76·3 per cent. of chloral, the hydrate 88·8 per cent.

A New Chloral.—Dr. Hoffmann† has related that in the production of chloral from a spirit containing aldehyd, a new substance is found mixed with the chloral, having the formula $C_4 H_3 Cl_3 O$, the formula for chloral being $C_2 HCl_3 O$. The medical properties of this new compound have not yet been determined.

Liquor Ferri Chloroxydi.—Chloroxyde ferrique is a name given by M. Jeannel, of Bordeaux, to a pure peroxide of iron, soluble in water and in dilute acids, which he prepared in the following manner:—Add ammonia to a pure solution of perchloride of iron, wash the precipitate several times with water, and then wash it with water acidulated with hydrochloric acid (1 in 1000); collect and dry the precipitate.

Mr. P. W. Squire, whilst preparing a concentrated solution of this chloroxyde ferrique, for Mr. Spencer Wells to use as a styptic, noticed the small quantity of acid required to dissolve it, and the absence of the peculiar rough taste of the tinctura and liquor ferri perchloridi. He therefore mentioned this to Mr. Wells, and some other surgeons and physicians, and suggested it as a substitute for the tinctura ferri perchloridi. The author has the permission of Mr. Wells to state that he has found it extremely useful externally as a styptic, and internally where the tincture of per-chloride of iron did not agree with the patient. A solution is made containing the same quantity of iron as the tinctura ferri perchloridi (Brit. Pharm.), and dispensed under the name of liquor ferri chloroxydi; a stronger solution being made for use as a styptic, and called liquor ferri chloroxydi fortior.

A nearly pure solution of oxide of iron may be procured by neutralising a pure solution of perchloride of iron with ammonia, and placing the whole in a dialyser; the nearly pure oxide of iron passes through, the chloride of ammonium remaining to a great extent behind. It can be purified by passing through the dialyser a second time.

* "Pharmaceutical Journal," Second Series, vol. xi., No. 13.

† Ibid., No. 11.

Ferric Iodate is prepared by precipitating a solution of iodide of potash with perchloride of iron, in the following manner:—Dissolve one ounce of iodate of potash in ten ounces of water, and add five drachms of liquor ferri perchloridi fortior, first diluted with four ounces of water; collect the whitish precipitate, wash, and dry at a gentle heat. Excess of iron must be avoided, as it is capable of re-dissolving the precipitate. The dose of iodate of iron is two to five grains.*

Linimentum Potassii Iodidi cum Sapone.—Mr. Wood† suggested that some of the difficulties in making this liniment might be overcome by using a soda soap made from oil of almonds, which, from the fact of its being a soda soap, would be easily purified and perfectly neutral. Mr. Evans, acting on this suggestion, had some of this kind of soap very carefully prepared, and has used it with perfect success in making both soap liniment and linimentum potassii iodidi cum sapone. If, on exposure to cold, it undergoes a separation, it is only necessary to warm it and shake it up, when it assumes a gelatinous consistence.

The So-called Soluble Peroxide of Iron of Chanteaud; also called Saccharated, or Crystallised Oxide of Iron.—Mr. Walter G. Smith‡ points out that for a dose equivalent to 5 grains of the ferri peroxidum hydratum, the minimum dose in the British Pharmacopœia, it would be necessary to order nearly 2½ ounces (1,041 grains) of this preparation.

Process for the Estimation of the Alkaloids in Cinchona Barks.§—Mix 100 grains of bark with 250 of lime, damp with water, and dry; exhaust the dry mass with boiling 90 per cent. alcohol, and filter the solution. To the filtered liquid, add a little dilute sulphuric acid and filter off the sulphate of lime, and evaporate to dryness over a water bath; to this add a little water, filter, and add caustic soda; the white precipitate resulting is the quantity of the alkaloids contained in the bark.

On the Alkaloids contained in the Wood of the Bebeeru, or Greenheart Tree.—Drs. Maclagan and A. Gamgee‖ have found that when this *wood* is subjected to a process similar to that recommended in the

* "Pharmaceutical Journal," Second Series, vol. x., No. 12.
† Ibid., vol. xi., No. 12.
‡ Ibid., No. 1.
§ Ibid., No. 11.
‖ Ibid., No. 1.

"British Pharmacopœia," for the preparation of sulphate of bebeerine from the *bark* of the tree, a mixture of the sulphates of several bases is obtained, not greatly differing from commercial sulphate of berbeerine. From this mixture of bases, treated with chloroform, resulted a base very soluble in that liquid, in the form, when purified, of a white non-crystalline powder, with an intensely bitter taste, and differing considerably from bebeerine. The name given to this new base is Nectandria, and its formula, $C_{20}H_{23}O_4N$ (C=12).

The Purification of Ammoniacal Salts from Gas Liquor for Pharmaceutical Purposes.—However often gas ammonias are recrystallised, they have still a tarry odour, which renders them unfit for the preparation of liquor ammoniæ acetatis. Mr. W. L. Scott* has lately adopted a method which he says has in many instances admirably fulfilled its purpose. To a solution of roughly purified sulphate of ammonium some persulphate of iron is added. The whole is brought to the boiling point. A small quantity of dilute solution of permanganate of potash is next added gradually, until a little of the liquor, filtered and neutralised with pure alkali, when cool, no longer decolorises a drop of the permanganate solution; a slight excess of alkali is added to precipitate the whole of the metallic oxides, which carry with then all that remain of the contaminating matters, and the liquor will then be quite free from all objectionable odour or flavour. The quantity of permanganate required is very small.

Method of Preserving Drugs perfectly Dry.—It is difficult to keep herbs, flowers, and other drugs perfectly free from damp. M. A. Melsens† recommends that the drawer or box in which they are kept should be fitted with a shallow sheet-iron tray, covered with metallic gauze or muslin. In the tray, fused carbonate of potash should be put, and the drugs should be placed on its porous cover. In this way the most delicate substances can be perfectly dried. In the case of those containing a great deal of water, it is necessary to change the carbonate of potash once or twice, and re-fuse it. The drawer or box should have a tight-fitting lid.

So-called Carbolate of Iodine, or Colourless Tincture of Iodine.—Mr. W. G. Smith‡ reports some experiments on this substance which

* "Pharm. Journal," Second Series, Vol. xi., No. 4.
† Ibid., xi., No. 6. ‡ Ibid., No. 5.

have led him to the conclusion that it contains no free iodine, but that it is a compound of carbolic acid, glycerine, water, and iodide of ammonium.

A contributor to the "Chemical News"* gives the formula for a new alloy, which is intended for the basis of a dental amalgam. It is composed of—tin, 61·72 parts; silver, 38·76 parts; copper, ·12 parts, and is in the form of rather coarse filings, nearly white. When warmed in an iron spoon with a little mercury, it soon enters into commixture with it. This warm amalgam when pressed in wash-leather in a pair of pincers looses much mercury, and the dry amalgam thus obtained is ready for insertion into the cavity to be stopped. This amalgam retains its whiteness in the mouth.

HOSPITALS, INFIRMARIES, AND DISPENSARIES. *Report by* PERCY LESLIE, M.D., ETC., ETC. (*of Birmingham*).

THIS department of medical polity has sustained a severe loss in the death of Sir James Simpson, and, indeed, what branch of our profession is there that will not have to lament his comparatively early removal from a sphere where he has been made the instrument of so much blessing to humanity? His masterly power of statistical inquiry has taught the profession, that an indifferent thriftless home really proves to be a better guarantee for the recovery of the sick than the most costly palatial structures erected for the purpose. The fruit of his labours is, perhaps, already observable, in that we have not to record such a number of gigantic undertakings as formerly, though we can hardly expect much improvement in this respect until the public is educated in the facts so self-evident to the profession.

Several hospitals and asylums have been completed, and others commenced, during the year.

The Prudhoe Convalescent Home, Whitley Links, near North Shields, erected as a memorial to Algernon, fourth Duke of Northumberland, at a cost of about £20,000, is an unpretending but pleasing Domestic Gothic building, on the pavilion plan, designed by Mr. T. Oliver, of Newcastle. It has a frontage of 230 feet, with a depth of 190, and will accommodate about 60

* "Chemical News," March 4, 1870.

inmates, to be raised eventually to 100. The whole is fireproof, and the appliances are on a liberal scale.

At Eastbourne, Sussex, a convalescent hospital has been opened, intended, when the design is fully carried out, to accommodate 300 inmates. It is a Gothic building, of red brick and stone, on the pavilion principle, Mr. H. Woodyer being the architect.

A well-arranged building for the reception of convalescent patients from St. George's Hospital, London, founded by Mr. Morley Atkinson, has also been opened at Wimbledon.

At Hanwell, a Roman Catholic Hospital has been erected at the cost of the Baroness Weld. It is a neat Gothic building, designed by Mr. E. W. Pugin.

Several large institutions for the London poor are in course of erection. At South Hornsey, close to the Alexandra Orphanage, an immense workhouse with infirmary, on the pavilion principle, has been built for Islington parish, from the designs of Mr. R. H. Burden, at a cost of about £65,000. For St. Pancras parish a vast infirmary has been built near the top of Maiden Lane, Highgate. The building, which is nearly completed, comprises five blocks, on the pavilion plan, each for thirty-two beds, with residences for nurses, a sixth for separated patients, an administrative block, dead house, &c. The arrangements seem good, and the site is naturally healthy; but the building is so situated that the female wards look directly upon the grounds of the Small-pox Hospital, the male wards upon Highgate Cemetery. The contract was taken for £32,000; the architect is Mr. J. Giles. Asylums for insane and imbecile paupers have been commenced at Leavesden, near Watford, for the northern parishes (to accommodate 1,500 patients, and to cost £90,000); and at Caterham, on a similar scale, for the southern parishes. Sites have also been purchased at Haverstock Hill for a fever hospital for the north-west parishes; and at Homerton for a fever and small-pox hospital for the north-east district; but, as before mentioned, there seems to be a growing disposition on the part of the public to resist the carrying out of some of these costly schemes.

In the country, infirmaries, similar in character, are being built, at Wantage and elsewhere. But the excessive mortality observed in them is leading to a strong feeling that the curative process would be better effected in smaller houses; and hence, what are called Cottage Hospitals, where fewer patients are congregated, and homely habits and nursing are possible, are becoming increasingly popular. Such are those now being erected by Sir Edward Hoare, at Ashford, Kent; the National Cottage Hospital for Consumptives, at

Ventnor, Isle of Wight; the City Missionaries' Sea-side Home, a block of cottages recently built by Captain Hursh, in a pleasant spot between Ventnor and Bonchurch. A new Cottage Hospital has been erected at Speen Beths, by the vicar, the Rev. Henry Majendie, where the practitioners from the neighbouring town of Newbury are to attend the patients.

The financial reports of these institutions contrast favourably with those of the larger character; this may arise from two reasons—their more economical scale of management, and the fact of a partially provident principle being generally incorporated.

The Croydon General Hospital reports £152 balance in hand, after paying all expenses. In-patients pay three shillings a week, and out-patients contribute sixpence per week while under treatment.

Dr. Davey, of Bristol, thus reports on the Hambrook Village Hospital:—Here each patient contributes from one to seven shillings weekly. The hospital has just completed the third year of its existence, the admissions to the end of last year have been 129, and the average payments per week have exceeded three shillings each patient. He argues from this, on behalf of the Bristol Infirmary—which, of course, is always in debt—if the same kind of management as that which obtains at our village hospital had been in operation, the sum received from "in-patients" would have exceeded £1,500. Further, in regard to the out-patients, which numbered 23,121, had each contributed but a single shilling to the income of the infirmary, it would have produced a second sum of £1,156.

Dr. Davey further reports the Stapleton General Dispensary, near Bristol, to be also on a provident basis and, in consequence, flourishing.

The Petworth Cottage Hospital admitted in the past year twenty-four patients, and the cost per patient was reduced to 9s. 8d. against 12s. 6d. in the previous year.

At the Leeds meeting of the British Medical Association, Dr. James Lewis, of Maesteg, drew attention to a cottage hospital with which he was connected, established seven years ago. It had been almost self-supporting during the whole of that time at a cost of 7s. 6d. a week for each individual.

"The Mutual Medical Aid Society" has lately sprung into existence in the Metropolitan districts, for which the profession is hardly responsible; as it offers terms of payment to medical men, there is no *prima facie* reason why it should not have the benefit of our services, as much as the numerous institutions

which give us bare thanks; but it labours under one or two grave errors, in common with kindred undertakings, it seeks to embrace a class equally scattered over the whole of London, *i.e.*, people of moderate means, above working people, and yet, instead of taking the services of all willing medical men, which would give it universal support, it confines its favours to a few. If private labour can naturally divide itself, why not, in such a public undertaking as this, particularly as the medical men are only paid by the number of members contracted for in each separate case. A special impropriety arises from the present position of the society—that patients of medical men are necessarily canvassed by its agents, *i.e.*, offered better terms if they will leave their present private doctor, and come to the association doctors. If all general practitioners were impartially employed, this objection would, of course, be removed. Another error lies in the fact that there is no effort to define moderate incomes, thus opening a wide door of abuse. This might be done as follows:—working[1] classes to be excluded, unless they themselves were employers of labour. No person living in a private house, rented at thirty pounds a year and upwards, should be a member. No person with shop-rent of £60 a year and upwards. No person who kept more than one house-servant. No person who paid income tax for £200 a year and upwards. By one or other of these tests every case could be systematically examined; without them the medical profession will be robbed right and left. The middle classes will be just as keen after cheap contract work, as the lower classes are after the supposed advantage of no payment at all, inculcated by the 1,000 free institutions of London. Many people will not scruple to deceive where money is concerned.

Not to lengthen the present report to too great an extent, it will be as well for me to turn to the various controversial meetings and papers where hospitalism has been made the theme of discussion during the past year. They may be thus enumerated—Captain Galton's paper on the "Construction of Hospitals," read before the thirty-seventh annual meeting of the British Medical Association, held in Leeds, July 27th, 28th, 29th, and 30th, 1869, giving rise to two very interesting discussions on hospitals and their effects on mortality. "Provident Dispensaries, their Object and Practical Working," by Dr. John Ford Anderson, read before the Metropolitan Counties Branch of the British Medical Association, April 29th, 1870. A Paper by Dr. Percy Leslie, addressed to the Birmingham and Midland Counties Branch of the same association, on the

subject of a Scheme for Adjusting the Relations of the Profession with the Medical Charities, and the charities one with another. "Hospitals and Medical Education," being the Inaugural Address delivered at the fifteenth annual meeting of the Birmingham and Midland Counties Branch of the British Medical Association, held June 17th, 1870, by Dr. Thomas Underhill, President of the Branch. Mr. J. Harmar, also, by a judicious use of the statistics bearing on hospitals, &c., read a most interesting paper before the Midland Medical Society in Birmingham. And, lastly, a large meeting held at the Royal Medical and Chirurgical Society's Rooms, on March 24th, for the purpose of considering the present system of medical relief at our hospitals and dispensaries; Sir William Fergusson in the chair.

Captain Galton's opinions, which were generally corroborated by the meeting, went to show:—The architect of an hospital ought to make his whole design subservient to three principles, and his watchwords should be, light and air, speedy removal of refuse, and great facility of cleansing. The smallest number of parts compatible with the requirements of the hospital should be arranged in the simplest form, and solely with reference to the wants of the patients, and to the way in which the service can be carried on with the smallest number of attendants. The architecture should be an expression of the need, and nothing more.

Dr. Evory Kennedy (Dublin) read a paper on "Zymotic Diseases and Hospitalism," and Mr. Birkett on "the Causes of Death after Amputation of Limbs in Hospitals."

The speakers who discussed these papers were pretty well divided, some in maintaining the destructive character of hospital treatment of disease, others in defending these institutions from such sweeping denunciations; but perhaps Dr. Gairdner most nearly hit the balance of the question, when "he held that an hospital was a necessary evil, and that there could be no doubt that, if the poor could be treated at their homes, so as to bring about and promote the conditions of recovery, hospitals might be dispensed with altogether. This, of course, is beyond hope, but the next best thing to it is to curtail their operations to a minimum, instead of, as at present, extending them to a maximum, till a third of our urban population is gratuitously physicked, and the charitable institutions themselves kept in a chronic state of impecuniosity, not to mention the well-ascertained danger of increased mortality from constant crowding.

Dr. Ford Anderson's observations on Provident Dispensaries involved some general remarks, and particular reference to existing

institutions successfully worked on provident principles (to which principles I may apply the argument used in the *Lancet*, when the editor was speaking of "Hospital Sunday." If a principle is sound, an increased area of operation presents no insuperable difficulty, *i.e.*, in this instance, to a universal application, in lieu of the supposed faulty system of gratuitous relief.) We have it on excellent authority that there are, in London alone, one thousand charitable societies, dispensing each, on an average, about £4,000 annually—that is four millions in all, and this is exclusive of the Poor-law expenditure. But Dr. Anderson asks, Is this benevolence tempered with prudence? Is it satisfactory that, in the face of this large outlay, want, misery, pauperism, and crime should be on the increase? Hospitals and dispensaries, managed on the privileged system by governor's letters, foster a spirit of dependence, and tend to keep down the rate of wages. The out-patient physicians and surgeons complain that they cannot, with justice to their patients or themselves, see and prescribe for several hundred patients in a morning, especially as many of the cases are new. The patients are selected by non-medical governors, without regard to urgency, who feel themselves aggrieved if their nominee is not admitted. Patients who can afford to pay are admitted. The delay in obtaining letters is often very hurtful to the patients.* As

* At the Royal Hospital for Diseases of the Chest, London, the selection of suitable cases and the avoidance of delay are provided for by the following forms of certificate, printed upon all governors' letters of admission for out-patients:—(Ed.)

I recommend as an Out-Patient to this Hospital,

now living at,

whom I believe to be a proper object of this Charity, without the means of paying for proper medical advice and medicine, but able to provide food, clothing, and lodging while under treatment.

Signature of Governor,

Date, 187 Residence of Governor,

N.B. Persons, unable to provide food, clothing, and lodging, should be sent to the Workhouse Infirmary or Dispensary.

All cases, which, in addition to the Governor's recommendation, have the following Medical Certificate duly signed, shall (provided they apply at the proper time) be admitted on the day of their first application at the hospital, whatever the number of new cases admitted on that day, and they shall take precedence of cases not so certified.

MEDICAL CERTIFICATE.

I, being a duly registered Medical Practitioner, can confirm from my own knowledge the Governor's recommendation, and I consider the case to be one requiring immediate attention at the hospital.

Signature, &c.,

Date, 187

Address,

regards the so-called "free system"—here there is no delay in obtaining early treatment, but the out-patient rooms are overcrowded, and patients who can afford to pay regular fees pass unchallenged; and the greatest blot of all remains, there is no attempt in the free system to rise above charity pure and simple.

A third scheme is mentioned, where a small payment is made at the time of coming for advice. To this Dr. Anderson objects, as the patients are called upon to make their payments at a time when they are necessarily out of work, and their funds are low, and their antecedents and social position are not known.

A fourth scheme prevails in the Scotch hospitals—for workmen to club together, and become, in the name of one of their number, managers of the hospital. Thus, in the Glasgow infirmary, the *præses* of a body of men subscribing five guineas annually, sits at the board. This is scarcely applicable to large mixed communities; where it exists it works well, and it has the merit of simplicity, and of introducing a provident principle.

Dr. Anderson then proceeds to the true provident scheme, first suggested by Mr. Smith, of Southam, forty years ago (in 1830), as a means of securing to the working classes medical aid in illness, without forcing them to have recourse to the parish, or to incur medical bills, which it was hopeless for them to pay. Pre-eminent among those who followed Mr. Smith were Mr. Jones, of Derby, and Dr. Wm. Ogle; also Dr. A. P. Stewart, and Mr. Stephen Alford. As a result of the efforts of such men, we have provident dispensaries at Derby 1830, Coventry 1831, Brighton, Northampton 1845, Paddington 1838; also at Wandsworth, Newcastle, Leamington, &c. Dr. Anderson then gives details of the working of these several institutions, each with a certain peculiarity, but agreeing generally in supplying a remedy for all the general and special objections to charities which he previously mentioned. Such institutions foster a spirit of independence, of forethought, and mutual assistance among the poor, on sound business principles; they tend to raise the rate of wages, as the members have to include this new outlay in their expenditure. They are easily managed, so as to prevent imposition by well-to-do people, as the members enter in time of health, and inquiries can then be made. Though the patients may be numerous, their cases are more easily disposed of, as they are members of the institution, and their medical antecedents are known. The medical officer selects the cases requiring care. No delay in obtaining letters, therefore less neglect, good facilities for registration of disease, economically managed, and the payments in time of health are manifestly better than the scheme

for payments during illness. Medical officers are paid, and yet have the same *kudos* as the gratuitous workers, an advantage to the profession, as may be seen from the following:—Northampton Dispensary divided in 1868 £1,296 18*s*. 11*d*. between the medical officers, Coventry £477, Brighton and Hove £262 18*s*. 11*d*., Haverstock £265.

Dr. Anderson argues, that the advice in our great London charities is little appreciated by the patients, from the smallness of the sums found annually in the donation boxes, where thousands of patients go. For instance, at the Middlesex Hospital, less than £5 a-year is subscribed; at Guy's Hospital the amount is under ten shillings. It is evident that the poor will not pay for themselves as long as anybody will pay for them; and as it is good for them to pay, they should be allowed no alternative but Poor-law relief. This, he thinks, can only be done by the combined action of hospital and dispensary authorities. The doctor further hints at the advisability of Government management, but the profession must lead the way; and when we have shown that provident hospitals are for the good of the community, Government will take them over, as it has already done with the Post Office and the telegraphs, and as it will next do with the railways. If the 1,358,805 patients treated gratuitously in London paid but one shilling, it would produce income sufficient to give 679 physicians and surgeons £100 a-year each. The provident system can do much educationally and economically towards staying the swelling current of pauperism.

The discussion was taken up by Dr. Joseph Rogers, W. Sedgwick, Dr. Drysdale, Mr. Lord, Mr. P. H. Holland, Dr. Stewart, Dr. Watkins, Dr. John Murray, H. T. H. Chapman. The meeting was almost unanimous in supporting Dr. Anderson's views, but, as is usual where great principles are enunciated, there was a little difficulty in agreeing upon details.

Dr. P. Leslie's paper, read before the Birmingham Branch of the same Association, went to establish the following axioms:—

(*a*) All medical charitable institutions in each district should be worked from a central committee.

(*b*) All medical men, willing, should be employed.

(*c*) All medical services should be remunerated.

(*d*) Every class of the community should contribute to this remuneration in some form, except *bonâ fide* paupers under the Poor Law Act.

The relation of the profession to the institutions, and of these to one another, was expressed diagrammatically in a series of circles,

numbered respectively, 1 (the centre), 2, 3, 4, 5, 6. Each circle being occupied as follows:—

1. A central committee; consisting of representatives from Boards of Guardians, and from the boards of the various institutions. Its duty to consist in appointing the post of each medical officer, and regulating the payments of provident members and individual patients, according to recognised rules.

2. Paupers under the Poor Law Act.

3. Dispensaries and clubs; to be supported by weekly payments on the part of members, and to receive honorary subscriptions and donations as at present; every inducement and pressure to be put on clubs to make the medical relief department fall in with the general dispensary management.

4. General hospital out-door departments; to be entirely assimilated with the dispensary system, in fact, to be each a provident dispensary. In-door departments to receive Poor-law patients, if desired, at the rate of weekly cost in work-house, to be paid by guardians. Other patients to pay a weekly sum for board, according to receipts of each several household, as ascertained by officers appointed for the purpose.

5. Special hospitals; to issue notes, bearing a certain value for certain definite periods, as might be calculated by average expense per patient, *e.g.*, an ophthalmic institution 3*s*. for one month's attendance, out-door-department; in-door, same regulation as in general hospitals.

NOTE.—These payments, of course, not to supersede the subscriptions of the rich, only to supplement them.

6. Private practice; to be guided by a legal scale of charges, not binding on the profession, except when their bills become the subject of legal proceeding; this would give uniformity, without interfering with individual liberty.

The funds of each institution, after paying all expenses, to be divided between acting medical officers, in the proportion of one-half to the consulting physicians and clinical teachers, medical or surgical, the other half to the general practitioners who filled the subordinate offices; in provincial hospitals, without medical school, funds to be equally divided.

After an animated discussion, in which Messrs. G. Yates, Furneaux Jordan, Manley, Pearce, Gamgee, Garman, Turton, T. H. Bartleet, Solomon, and Drs. W. Hinds and Russell took part, it was proposed and carried:—

"That the members of the Birmingham and Midland Counties Branch of the British Medical Association, convinced of the great

and ever-increasing anomalies of the present system for administration of gratuitous medical relief, both as regards the public and the profession, hereby propose to form a Board of Inquiry, which, without committing itself to any particular line of action, shall, by all legitimate means, seek to obtain information as to the causes of complaint, and direct by public discussion, publication of statistics and correspondence with governing bodies, the best course to be taken to obtain redress."

I must now glance at the masterly address delivered by Mr. Thomas Underhill at the annual meeting of the British Medical Association. At the request of the meeting it has been published and printed in a separate form by Cornish Brothers, Birmingham.

Mr. Underhill's arguments—as he draws attention to the statistics, mortality, cost per patient in building and maintenance, of our various institutions—are most crushing as regards the continuance of such an appalling state of matters as he there depicts; he bids those on whom the responsibility rests beware; he describes a Fellow of the Royal Society saying, "I have long felt the grievous unreality of the out-patient system, which, in fact, amounts to a mockery of both God and man." But the paper must be read to be realised, and from the fact of its being a President's Inaugural Address, and giving rise to no argument, it will be as well to leave it with this notice.

The large meeting held at the Royal Medical and Chirurgical Society's Rooms, March 24th, 1870, for the purpose of considering the present system of medical relief at our hospitals and dispensaries, gave rise to much interesting discussion.

Sir W. Fergusson occupied the Chair, and Drs. Stallard and Heywood Smith acted as Secretaries. There was a large attendance. Amongst those present were—Mr. Holmes Coote, Mr. T. Holmes, Dr. A. P. Stewart, Mr. H. Lee, Mr. Critchett, Dr. Fuller, Dr. Burdon Sanderson, Dr. Dobell, Mr. Erasmus Wilson, Mr. Partridge, Mr. Hancock, Dr. Clapton, Dr. Cayley, Dr. Yeo, Mr. Birkett, Dr. Silver, Dr. Pollock, Mr. Jonathan Hutchinson, Dr. Buzzard, Dr. Edis, Mr. Henry Smith, Dr. Meadows, Dr. Liddle, Mr. Curgenven, Dr. Anstie, Dr. John Murray, Mr. T. Smith, Dr. Walker, Dr. Glover, &c.

Mr. Holmes Coote alluded to the enormous proportion of the people of the metropolis who received gratuitous relief. The abuse had spread to our large towns, and was now reaching even the villages. He considered that medical men themselves were to blame for not having taken up the matter. Practitioners in the neighbourhood of his own hospital were being swept away. Yet he thought the general hospitals ought to be free, and considered the old system of governor's letters a good one. He moved the first resolution—"That this meeting is of opinion that there exists a great and increasing abuse of out-door relief at the

various hospitals and dispensaries of the metropolis, which urgently requires a remedy."

Mr. Holmes seconded the resolution. He considered that Mr. Hardy's Poor Law Dispensaries would do away largely with the abuse, and the best thing would be to get them immediately put in force. He did not think that the total number of persons who obtained sick advice in the metropolis was anything like a million, as had been stated. The assistance which he had given to his own out-patients was merely nominal; he had been ashamed of his out-patient practice. Was it not notorious that in the out-patient departments in our hospitals the cases were seen at the rate of one minute and a half each, or by a pupil ignorant of medicine? He thought every man should see his own patients, and that by proper supervision the cases should be limited. It might also be right to discontinue dispensing medicine, as in Paris.

Mr. H. Lee said that charitable people themselves increased the number of patients; and medical men also, by interfering with their professional brethren.

Dr. Liddle was of opinion that the system of out-patient practice should be removed, except for special cases or accidents. An out-patient at the London Hospital used to send her servant to keep a place for her. The hospitals encourage the abuse by wishing to show large numbers in their reports. Out of 76,000 persons in his district there were 20,000 paupers. He thought medical officers should often refuse medicines.

Dr. Fuller thought we were demoralising the community, and lowering ourselves, but the doing away of out-patient practice was not to be thought of. What was required was to regulate the admission of patients.

Mr. Curgenven said there should be a registrar attached to each hospital to take down the addresses of the patients who presented themselves, and that he should call at the houses of a certain number to ascertain if they were proper objects for relief.

Mr. Gant had brought before the committee of his hospital the status of certain of his patients. His report had impressed the committee, who had since taken the matter up. The number of out-patients had now decreased.

Dr. Routh said that, if all the out-patient hospital practice were stopped, dispensaries would crop up in all directions, and other medical men would continue the abuse. At the Samaritan Hospital the committee had adopted the following plan, with the view of preventing abuse as much as possible. Each patient was asked whether she kept a servant, and what house-rent she paid. If above £30 a year, she was not admitted until her case had been considered by the committee. The result very frequently was, either that the patients became governors, and then attended the hospital, or they came as private patients to the houses of the medical men, and paid, perhaps, altogether £20 or £30 for advice. Many patients, again, came to special hospitals, not for advice, but to obtain the address of a good man.

Dr. Glover did not think that the meeting sufficiently admitted the poverty of those who applied. Many families at present were

supported by the wife, the husband being out of work. He thought the provident system ought to be considered, but he did not desire too radical reforms.

Mr. Young thought that the provident system should be adopted. His experience was very favourable to this. They should assist those who assisted themselves. He subscribed to a general hospital to be a governor, in order to see that they did not admit improper cases.

Dr. O'Connor—Could safely aver that few, if any, of the patients at the Royal Free Hospital were able to pay for medical advice or medicine, although, perhaps, they could afford to belong to a provident society. The great evil which he observed in the out-patient department was the granting of certificates gratis at hospitals to those who wished to get on trade benefit societies.

Mr. Watt thought it no part of the duty of medical officers to investigate the social position of the patients. It was the duty of the governors and committee to give their time to this.

Dr. A. P. Stewart said that a long discussion on hospital relief had taken place last year in the Medical Society's Rooms, and a large committee had been formed to consider and report on the subject, but, owing to circumstances which every one present regretted, the committee had not been able to carry out their investigation. It would be well if a remedy were pointed out for the abuse of hospital relief, and he thought we were now ready for some change. We owed this to the benevolence of the people who set up institutions, but who, as soon as they were established, set about concocting elaborate means of checking the abuses which they themselves had brought about. There was only one outlet, that of setting up a new system—the provident system—to which the objections to gratuitous relief do not apply. All checks on the old system will be found inefficient. He then went on to remark on the manner, often of shame, which a patient first wore when coming as an out-patient; but, soon losing self-respect, becoming at length defiant, and exhibiting what Lord Brougham had described as "the sturdy air of a masterful beggar." The system was raising the number of paupers. The free dispensary was the first step down the inclined plane to the parish, while the Provident Dispensary was the first step up the inclined plane to the savings' bank. He moved the following amendment:—"That in the opinion of this meeting the evils inseparable from the system of gratuitous medical relief administered at the out-door department of hospitals and in free dispensaries can be only met by the establishment on a large scale of Provident Dispensaries, not only in this metropolis, but throughout the kingdom, and by improved administration of Poor Law medical relief.

Dr. Charles Drysdale thought a Royal Commission should be demanded, to enquire into the administration of the large endowed hospitals, and the system of open competition as carried out in Paris.

Dr. Yeo referred to the system in force at Guy's Hospital for the selection of out-patients. The more serious or difficult cases are

sent to the medical officers, while the others are retained and seen by assistants.

Mr. Erasmus Wilson thought the original motion and amendment should be put together. He approved of the provident system, and referred to the success of the institutions at Northampton and at Rugeley, in Staffordshire.

Dr. Heywood Smith and Dr. Anstie thought the means of carrying out reform should be left for the consideration of the Committee.

Dr. Stewart was then requested by Mr. Partridge to withdraw his amendment; but this Dr. Stewart declined to do. After some further discussion, in which Dr. Fitzpatrick suggested that the Committee should take evidence on the principle of a Parliamentary Committee, and Dr. Cleveland remarked that the provident system did not relieve the really indigent,

Mr. Holmes said that he would not object to Dr. Stewart's amendment if it were understood that it would be considered by the Committee as other suggestions. To this Dr. Stewart still objected. He wished an expression of opinion from the meeting.

Dr. Fuller moved that the word "only" be left out. This was seconded by Dr. J. E. Pollock, who considered that many medical men would decline to give services for such paltry sums as £60 and £90, which had been mentioned. He thought that the provident system would not meet the case of decayed governesses, servants, and a class of such people.

Dr. Dudfield then proposed that the words "in great measure" be inserted in Dr. Stewart's amendment.

The amendment was then put in this form, but was lost by a majority.

The following resolution was then proposed by Mr. Rivington, seconded by Dr. O'Connor, and carried—"That this resolution be referred to a committee."

Mr. Hancock proposed and Dr. Fitzpatrick seconded the next resolution—"That a committee be appointed to investigate the working of out-patient departments as at present constituted, and to draw up suggestions for reform to be submitted to a future meeting."

The following names were placed on the committee:—Dr. Burrows, Mr. Bowman, Dr. Stewart, Mr. Spencer Wells, Mr. Critchett, Dr. Stallard, Mr. Holmes Coote, Mr. T. Holmes, Dr. Burdon Sanderson, Mr. J. Hutchinson, Dr. H. Power, Dr. G. P. Murray, Dr. Anstie, Dr. Dickinson, Mr. G. Lawson, Mr. W. Adams, Mr. Christopher Heath, Dr. Protheroe Smith, Dr. A. Meadows, Dr. Morell Mackenzie, Mr. Walter Coulson, Dr. Buzzard, Dr. Dudfield, Mr. Callender, Mr. W. F. Teevan, Dr. Silver, Mr. Curgenven, Mr. J. Gant, Dr. Heywood Smith, Dr. J. E. Pollock, Dr. John Murray, Dr. Glover, Mr. R. G. Whitfield, Dr. Clapton, Mr. R. B. Carter, Mr. Wilkinson, Mr. Cooper Forster, Mr. A. E. Durham, Mr. A. Ebsworth.

This meeting is perhaps one of the most representative as regards the expression of opinion, on the side opposed to reformation; one could wish, for the sake of eliciting information, the others were equally so; at the same time the office of reviewer might be cleared from the imputation of partiality, which can hardly be the case when the speaking is all on one side. There is doubtless a large proportion of the profession who are content to let things remain in *statu quo*.

It would be premature to report the work of the committee appointed at the last-mentioned meeting, as their deliberations have not yet concluded. Suffice it to say, so far as they have gone, it is but to corroborate all that previous reformers have wished to impress on the public at large. Neither must we be unmindful of the fact that the eyes of intelligent philanthropists are upon us, and in a meeting convened for the purpose of amalgamating the operation of charities, so that there should not be a dozen forces directed to a single point when one would suffice, the *Saturday Review* reports such language as the following, from Lord Derby:—"Is it wonderful that, given these charities, public, parochial, and local, on the one hand, and this flabby benevolence on the other, beggary and imposture should thrive in London? It would be wonderful if they did not thrive. Never was there such a paradise of beggars. Neither Naples, nor Rome, nor Jerusalem, nor Berne can compete with it. It stands out distinct, paramount, and unapproachable, as the Canaan—the Land of Promise—not for the struggling poor, but for the determined and trained professional beggar." To quote Sir C. Trevelyan's pamphlet:—"All who prefer idleness to industry know that by merely removing to London they are certain to have all their wants supplied, without the necessity of self-exertion. They never can be without food, clothing, or lodging. Whatever form of ailment they happen to suffer from has its appropriate hospital, where they are taken in, and have the advantage of surgical and medical skill, such as rarely falls to the lot even of the rich. When they become convalescent, they are sent to the sea-side, or to the heaths of Surrey, to complete the recovery of their health. Their children are taken off their hands by a great variety of nurseries, homes, refuges, reformatories. . . ."

Mr. Goschen, the President of the Poor Law Board, is of the same opinion, and who should be a better judge than he?

Verily, if all be true that such meetings disclose of the moral and physical degradation of which we are guilty, we had better go back to the founders of our art to learn the rudiments afresh.

Cabanis tells us of the Θεραπεύται of old, "that the air respired

in the country surrounding the Æsculapian temples, was naturally pure, from the elevation of the soil, and was rendered still more salubrious by the woods which encompassed them ..... for an unhealthy abode would have been very unsuitable for the god of Physic. If his advice did not always restore health, *it was at least becoming that the patients should not contract new disorders at the foot of his altar.* In consequence of some prudent precautions in this respect many cures must have been accomplished which maintained his reputation, the better that he had no occasion to labour in order to acquire it."

CALIFORNIA.

Report on Sacramento by THOMAS M. LOGAN, M.D., *Permanent Secretary of the State Board of Health, &c.*

TOPOGRAPHY.

THE extensive valley in which the city of Sacramento is located, almost centrally, is drained by the Sacramento river, coming from the north, and the San Joaquin from the south. Into the current of these rivers, their tributaries pour the waters from the western slope of the Sierras on the east, and from the eastern slope of the Coast Range on the west. Through a considerable break in the Coast Range at Suisun Bay, after uniting to form a sort of delta, the two rivers find their way to the ocean. They are bounded on each side by vast flats, subject to annual overflow, and forming an immense extent of marsh land, or *tulare*. These flats are intersected in all directions by extensive sloughs and lakes, which frequently have no communication with the rivers, except at the time of freshets, or high tides. As is observed along the banks of the Mississippi, in Lower Louisiana, the topography of which bears a strong resemblance to that of this valley, the banks of the Sacramento and San Joaquin form, as a general thing, the highest part of the immediate country through which they pass; so that, when the rivers fall after an overflow, a very large surface of land is left undrained. Beyond a mile or two of these rivers, however, there is a large extent of country whose broad plains remain unaffected by the rains of winter, and where no standing bodies of water are to be seen. The soil of the valley is a fine alluvium, in some parts sandy, and in others composed of tenacious clay. These superficial layers repose on alluvial strata, which being generally gravelly, allow the water to drain off, to some extent corresponding with the fall of the rivers, although the greater part is carried off by evaporation during the early summer months.

Immediately at the confluence of the American river, one of the tributaries, with the Sacramento, and on the eastern bank of the latter river, and southern side of the former, lies the city of Sacramento, distant about 125 miles from San Francisco, and 35

from the point where the river debouches into Suisun Bay. The built portion of the city occupies an area of about a mile square, fronting on the Sacramento river, and is in latitude 38° 31′ N., longitude 121° 20′ W., at an elevation of 74 feet at the top of the levee above the sea. The corporate limits, however, embrace an area of nearly 2½ miles square, in which streets, of 80 feet width, are laid out at right angles, forming blocks of 320 feet square.

About one-third of the site of the city is an alluvial bed, formed by the tulare, or swamp-lands, which extend over a large portion of the valley bordering on the river, and has been subject to overflow until the building of the levee. Some portions are still unrecovered, viz., Sutter Lake, on the north-west corner of the city, and several sloughs near the American river. A bed of indurated clay and gravel forms the surface of the remaining portion of the site, which mostly lies on its eastern side, and rises into a ridge, elevated about 50 feet, crossing the city diagonally. At the western base of this ridge the remains of a slough are found, which, it would seem, at one period carried off the waters of the American river, and discharged them into the Sacramento below the city. A bed of quicksand, on a substratum of gravel and boulders, appears to underlie the bottom lands of the city, but whether this formation extends under the ridge and gravelly districts is as yet undetermined.

Water can be readily obtained from wells in any part of the city, its level appears to rise and fall with that of the river. The quality of the water differs at short distances apart; in some places it has a milky appearance, and alkaline taste, rendering it unfit for drinking or cooking; while in other places, althought presenting a clear, transparent, and crystalline appearance to the naked eye, it has been shown by recent chemical and microscopical examination to contain organic matter of the most deleterious nature. Fortunately, however, in the river water, which flows by our doors, and is conducted into all parts of the city by means of a system of water works, soon to be perfected by proper filterage, we have the purest and best potable water that can be found on the face of the globe.

The drainage of the city is naturally very imperfect, but is now being effectually modified, improved, and perfected. The original surface level presents three different elevations: the northern, southern, and central. The northern is irregular, and exhibits at and around Sutter Lake the lowest, and at the public square, bounded by Ninth and Tenth, I and J streets, the highest natural level. The central portion embraces I, J, K, and Front streets,

which, with the intersecting streets, have now been raised nine feet above the level of the square, *i.e.*, above the highest water marks yet known. The southern section embraces all the south of L street, and is in some points not only so much lower than the artificial height to which the three main streets of the city have been raised, but through a great part of its extent is a slough, into which the water of the Sacramento river formerly backed up, at a high stage of the river, from below Sutterville, which slough is supposed to have once been the bed of the American river. Into this lower part most of the city is drained, and the water is conducted off by a deep ditch into the slough below Sutterville.

The cemeteries are situated beyond the corporate limits, on the eastern and southern edges of the city, and receive the dead of the surrounding country; but, in making up our mortuary calculation, we have only included those who died within the city proper. In computing the *pro rata* mortality, an allowance ought to be made for the floating population, constantly present within its precincts, many of whom come to the city for the benefit of medical treatment, and dying, add to the sum of mortality.

Meteorology.

In the following tables will be found, in a condensed form, the results of twenty years diligent observation of the climate of Sacramento, with more particular reference to rain. A single glance at the rain tables will present the amount of rain which has fallen since 1849, the quantity in each season, the quantity before and after the end of the year, the date of the beginning and ending of each rainy season, and the date of the first and last scattering rains. The climate is thus seen to have seven months in which it always rains, more or less, viz., from November to May, inclusive, with only one single exception; and five in which it seldom rains, and then for the most part very lightly. June, July, and August are the driest, as well as the hottest months. The heavy rain in July, 1860, when over half-an-inch fell, is a rare exception to the general rule. September and October may be regarded as intermediate between the dry and hot, and rainy and cold months. In September, 1851, one inch of rain fell; and the mean monthly rain for the last twenty years, amounting to ·071 inches, shows the tendency in this month to aqueous precipitation. In October, 1858, three inches fell, and the mean monthly rain is nearly half-an-inch December furnishes more than any

other month; January next; then February, March, November, April, and May, in the order named. The rain of September, 1851, and that of July, 1860, present the greatest deviation from the rule. The greatest amount of water that ever fell in any one month was in January, 1862, and the next greatest in December, 1852. One-half of the supply for the season falls before the last of January, and the other half after that date. There is generally an interim of dry weather between these dates of four to six weeks' duration. The spring rains are quite as constant as those of the previous period, observing generally the same tendency. If they fall sparingly in the earlier half of the season, they will continue to do so in the latter half.

The tabulated series of the results of the thermometer, taken in connection with the rain tables, may be made the basis for estimating these chief items of what constitutes climate in the great valley portions of the State. To facilitate the comparative estimate of a more extended area, a recapitulation, with the latitude, longitude, altitude, and mean annual amount of rain, has been expressly framed, including all the localities whence I have been able to collect the data. These contrasted summaries show how irregularly isothermal localities in the State are distributed, and also how widely the nearest approximated points are thermally distinguished from each other. It is also seen that while there are but few places in which the precipitation of aqueous vapour is approximately the same, there are many in which the difference is remarkably striking. Referring to the table, it will be seen that San Francisco has no summer. July, the hottest month in Sacramento and elsewhere, is the fourth in the order of heat in San Francisco. From the tables of the extremes of heat and cold it appears that the coldest weather ever experienced, since the American settlement of the State, was in January, 1854, when the mercury fell to 19° in Sacramento. At that time, the mud in the streets was all day frozen solid, and the slough was frozen over a whole day, so that one could walk over the edges of it. Such remarkably cold weather, however, is extremely rare. The extreme of heat experienced at San Francisco, was on the 10th and 11th of September. 1852, when the thermometer reached 97° and 98° on the two days respectively. This, however, was altogether exceptional. In Sacramento the temperature frequently rises as high during the summer months, and on four different dates it reached as high as 100°, and once, in July, to 101°.

The evenness of the climate of Stockton, presented in the Comparative Table, is not reliable, inasmuch as the results have been

made up from observations at certain hours of the day, from which a true mean cannot be deduced. At Sacramento is found the type of all the great valley regions and plains of the State; in fact, we may say, of all the Pacific and interior arid climates—with the exception of the immediate coast district—irrespective of altitude, Its climatological distinctions are the same which characterise the Great Basin and arid plains west of the 100th meridian, and to which Fremont has applied the expressive designation of *Asiatic* climates. Especially does this hold good during the summer months, when the number of hours of increasing heat considerably exceed those of radiation. With little surface humidity during summer to retard the accumulation of heat from the sun's rays, the afternoon temperature frequently becomes, for a short time during the day, as great as that of districts ten or twelve degrees farther south on the Atlantic side; but it is rapidly radiated at night, the absence of clouds facilitating both processes. The temperature of evaporation, not found in the tables, gives the instrumental proof of this. In the great daily range of temperature is shown another striking and constant Asiatic feature. This diurnal range, although great, is not sudden as at San Francisco, and hence is unattended by those disagreeable sensations and impressions upon the nervous system which the more abrupt deviation produces in those not habituated to it. Indeed, if one takes into consideration the rapid evaporation which is going on from the surface of the body, and which renders perspiration almost insensible—except under physical exercise—producing an exemption from the languor and oppressiveness experienced during the heat of the summers of the Atlantic States, and reflects upon the cool nights always attendant here, requiring one or more blankets for comfort, some adequate idea may be conceived of the refreshing luxury of the climate.

Referring now to the accompanying tables, which are calculated to demonstrate at a glance intensities, amounts, and results with an infinite saving of time, and, what is far more desirable, with numerical precision of truth, I leave the intelligent reader to form his own opinion as to the geographical, climatic, and sanitary advantages appertaining to the City of the Plains.

The City Death-rate.

As a matter of historic interest, the last of the succeeding tables has been compiled. For statistical purposes it is of little or no value, because we have no positive knowledge respecting the

fluctuations of the population, by births and by immigration, during the years over which it extends. Still there is much information involved in it, which is worthy of the investigation of the curious, and especially of those who have lived through the first vicenniad of the city's existence. The limits of this article will not permit me to enter into details; nevertheless, there are a few prominent and pertinent facts and deductions to which I cannot refrain from alluding. It will be seen that the months of September, October, and November are the most fatal, and it is just at this time, after the long-continued summer's heat, when the vital resistance is impaired, that the empoisonment, by filth on the one hand, and the external sources of miasmatic disease on the other, are in all their intensity. It was during these months, in 1850, and again in 1852, that the Asiatic cholera swept over the city with the besom of destruction, almost to depopulation, in the former year. Again, in the fall of 1860, the justly dreaded diphtheria reached its most malignant stage, and contributed to swell the table of mortality. It thus would appear that the fluctuations of the death-rate are excessive in proportion as the civic and climatic sources of disease are in their most abundant and active condition. The increased mortality in the fall of 1864 was not due to similar causation, but to the accident which befel the unfortunates from the steamer *Washoe*, who were brought here for treatment. The years 1868—1869 must be regarded as exceptional, as during all this calamitous period we suffered more or less from the effects of the great *pandemic* wave, enhanced here by a most malignant type of small-pox, which rolled over the whole earth.

As has just been stated, an ascertained rate of yearly increase of population, both by births and by immigration, as well as an accurate census, are necessary elements for the basis of such a statement of decimal ratios, as will give the death-rate of each year with that degree of mathematical precision which is necessary to make it of real value. The result of the decennial census not being at hand, I deem it sufficient, at this time, that the death-rate for the year just passed may be expressed upon the basis of 20,000 inhabitants. This would include the large floating population, and would warrant a statement of its being 24·25 per 1,000 inhabitants. We have just seen, however, that the year 1869 was exceptional, and therefore it can scarcely be regarded as a fair specimen. In 1867, we have an instance of a very healthy year. Averaging the mortality, then, of this year, when the population, owing to the great addition from labourers on the railroad, was, perhaps, greater than it is at present, with that of 1869, we shall

have a death-rate of 18·13 in 1,000 inhabitants, which is as near an approximation of the real state of the case as we can at present arrive at. This places Sacramento among the healthiest cities in the civilized world. As compared with other commercial cities, New York and Brooklyn afford a good standard, inasmuch as their death-rates are upon a par with the rates in the other maritime cities in the United States, and below those of the chief cities in Europe. In the Metropolitan Report of the Board of Health for 1870, I find the death-rate for New York put down as 25·13 per 1,000, and 22·59 for Brooklyn. The average death-rate in the fourteen chief cities in Great Britain, in the year 1868, was precisely 25·68 per 1,000. London had a rate of only 23·59 per 1,000, while that of Glasgow was 30·47. The rate in Paris was about 24 per 1,000, while that of Berlin and Vienna was less than 30 in 1,000 only for a few months of the year.

In forming an opinion from these figures, it must be borne in mind that it is well-established by sanitarians that 11 deaths annually in every 1,000 living population are unavoidable, but that any excess over this in healthy *countries* is preventible. I italicise countries, because cities are more unhealthy; but even for these, 17 per 1,000 is deemed the very extreme of *necessary* mortality. But whilst many cities have, in occasional years, a death-rate lower than 17 per 1,000, yet as a general average for all cities, 25 per 1,000 (2·5 per cent., or 1 death to every 40 living) is practically regarded at the present day as a fair standard of health, whilst under 20 is deemed very healthy, and over 30 decidedly unhealthy.

I leave these facts and deductions to speak for Sacramento.

Table exhibiting the Monthly and Annual Mortality, from the founding of the City to the present time—a period of Twenty Years.

Months.	1850...	1851...	1852...	1853...	1854...	1855...	1856...	1857...	1858...	1859...	1860...	1861...	1862...	1863...	1864...	1865...	1866...	1867...	1868...	1869...
January	.....	37	19	44	37	81	27	17	24	27	47	42	34	35	35	30	23	25	34	49
February	.....	36	21	29	16	17	32	11	17	15	32	29	33	25	24	23	20	21	25	38
March	.....	21	23	21	23	19	16	16	25	24	26	21	33	27	29	27	26	28	21	38
April	10	22	18	28	12	16	30	23	22	18	35	29	24	22	44	22	19	28	22	43
May	22	18	20	20	16	17	25	29	31	19	37	22	29	26	41	22	29	27	27	41
June	30	13	29	18	19	20	26	24	27	22	33	20	23	30	38	20	28	24	56	33
July	31	15	45	15	20	17	28	22	17	32	41	24	36	26	26	33	27	20	58	31
August	47	15	77	41	20	26	35	34	24	26	22	33	28	30	27	29	19	20	42	25
September	57	20	185	9	20	22	25	22	24	24	28	26	22	32	56	34	30	24	32	39
October	325	21	79	37	32	30	45	28	34	31	39	37	34	35	33	53	38	26	35	48
November	326	28	76	31	27	33	28	42	30	30	45	40	34	45	41	38	28	19	53	57
December	52	39	43	40	28	26	21	25	27	39	51	37	25	49	32	27	29	25	39	43
Totals	900	280	635	333	265	324	333	288	302	307	486	361	353	380	426	358	316	287	444	485

Mean Temperature of each Month at Sacramento, since Eighteen Hundred and Fifty-two, deduced from three daily observations; also the Mean Temperature of each Year, and the Mean of Seventeen Years.

Months.	1853...	1854...	1855...	1856...	1857...	1858...	1859...	1860...	1861...	1862...	1863...	1864...	1865...	1866...	1867...	1868...	1869...	Mean...
January	43.00	43.00	43.71	48.02	48.54	45.03	44.87	46.20	47.12	46.41	46.87	49.17	47.42	46.52	48.18	49.50	47.50	46.58
February	50.00	51.00	52.50	52.64	50.25	52.24	50.49	49.83	52.17	47.50	47.96	53.65	49.04	53.48	47.80	51.00	51.29	48.40
March	59.80	53.00	54.82	57.03	56.42	53.74	51.47	53.30	55.05	53.58	57.62	56.07	53.60	54.18	50.67	54.69	57 28	54.83
April	61.00	60.00	58.06	58.80	63.27	59.80	57.11	57.82	60.65	58.05	59 46	62.12	59.35	61.89	60.00	59.16	60.06	59.20
May	68.00	62.00	60.20	63.91	65.51	65.19	63.03	58.48	63.70	61.25	67.14	68.48	70.22	63.06	64.00	64.94	63.00	64.83
June	77.00	67.00	71.10	71.06	71.93	69.48	74.85	65.64	66.18	69.38	69.08	71.10	78.47	72.16	71.62	70.73	69.50	70.65
July	75.00	80.63	72.55	75.12	71.45	70.81	69.07	73.17	73.57	73.19	75.68	74.84	74.01	76.23	75.00	73.68	72.10	73.59
August	71.00	69.47	73.04	69.59	71.31	70.57	67.16	73.50	69.73	75.00	70.66	74.70	71.74	76.03	74.95	71.89	70.09	71.79
September	76.00	65.05	68.01	70.93	67.93	68.90	65.89	67.59	67.78	70.41	68.98	69.83	68.84	72.16	66.30	67.64	66.60	67.57
October	78.00	60.01	63.01	58.04	61 49	59.51	63.28	59 76	59.91	67.60	62.84	64.54	63.07	65.20	60.15	63.09	62.05	63.03
November	53.00	55 05	50.65	52.18	53.24	54.23	54.05	53.47	53.60	53.15	52.74	53.53	56.90	53.84	54.76	53.76	53 66	53.66
December	48.00	47.98	45.99	43.86	47.37	44.17	43.52	49.34	50.98	46.44	46.49	50.18	44.13	50.17	49.90	47.24	43.45	47.02
Mean	62.57	59.51	59.47	60.10	60.73	59.49	58.73	59.01	60.12	60.16	60.35	62.82	60.98	62.08	60.27	60.61	59.71	60.25

Extremes of Heat in each Month at Sacramento since Eighteen Hundred and Fifty-Two.

Months.	1853...	1854...	1855...	1856...	1857...	1858...	1859...	1860...	1861...	1862...	1863...	1864...	1865...	1866...	1867...	1868...	1869...	Mean...
January	66	59	62	60	63	58	58	56	58	60	60	69	60	61	60	62	64	61
February	68	62	70	69	62	66	63	66	62	64	63	71	61	66	61	66	78	65
March	75	68	76	79	69	66	66	65	70	72	76	77	71	69	70	72	79	72
April	76	75	81	70	83	85	78	78	76	76	81	89	83	87	80	76	86	80
May	78	77	90	83	91	81	84	74	77	80	88	96	92	92	87	82	97	81
June	97	90	100	97	101	92	102	86	82	88	94	97	94	97	97	96	99	76
July	93	101	99	100	94	98	92	93	92	93	97	97	94	99	99	97	98	94
August	93	99	98	99	96	90	89	92	90	95	95	95	91	100	90	98	96	90
September	95	90	94	98	86	92	85	89	84	94	90	89	91	94	96	91	86	90
October	88	90	93	78	79	80	87	81	78	86	88	89	87	94	79	85	79	84
November	72	70	69	79	67	69	70	67	68	70	70	71	74	75	70	71	70	70
December	64	68	59	54	58	53	54	60	63	60	60	62	59	68	66	60	56	60
Year (average)	80	79	75	72	79	78	77	75	74	78	80	83	79	83	79	76	82	78

Extremes of Cold in each Month at Sacramento, since Eighteen Hundred and Fifty-Two.

Months.	1853...	1854...	1855...	1856...	1857...	1858...	1859...	1860...	1861...	1862...	1863...	1864...	1865...	1866...	1867...	1868...	1869...	Mean...
January	33	19	27	30	30	29	30	32	30	29	33	34	32	32	32	34	34	31
February	38	38	32	37	30	32	34	32	45	36	35	37	35	41	32	36	34	35
March	46	37	41	37	40	37	36	34	42	40	40	39	32	40	34	38	44	38
April	50	49	41	43	45	42	36	38	47	42	42	40	57	43	42	43	44	40
May	54	48	44	45	51	46	45	37	50	42	51	47	54	40	48	49	52	47
June	58	49	52	52	54	52	51	48	53	52	52	54	54	50	50	53	56	52
July	62	50	58	55	53	53	51	51	61	54	60	57	57	54	53	55	59	55
August	58	52	60	53	55	55	52	54	58	51	56	60	58	53	52	54	56	54
September	54	48	54	52	52	50	50	50	57	50	53	54	53	52	51	52	50	52
October	58	49	45	37	45	38	43	41	46	47	40	46	50	43	41	41	40	43
November	46	44	34	34	35	34	37	35	39	37	34	37	45	34	36	34	37	37
December	32	29	25	29	32	23	28	33	39	33	32	32	30	33	34	30	29	31
Year (average)	49	43	43	42	43	41	41	40	47	43	42	45	46	43	42	43	44	43

RAIN TABLE FOR SACRAMENTO.

Arranged according to the seasons, showing the amount in inches of each month during twenty years, and for each rainy season; also, the mean quantity for every month, and the mean annual amount of rain.

Months.	1849....	1850....	1851....	1852....	1853....	1854....	1855....	1856....	1857....	1858....	1859....	1860....	1861....	1862....	1863....	1864....	1865....	1866....	1867....	1868....	Mean....
September	0.250	0.000	1.000	0.003	1.000	sp'kl	sp'kl	sp'kl	0.000	sp'kl	0.025	0.063	0.000	0.000	0.003	0.004	0.080	0.000	0.006	0.000	0.071
October	1.500	0.000	0.180	0.000	0.005	1.010	0.000	0.195	0.655	3.010	0.000	0.914	sp'kl	0.355	0.000	0.120	0.480	0.001	0.000	0.000	0.421
November	2.250	sp'kl	2.140	6.000	1.500	0.650	0.750	0.651	2.406	0.147	6.485	0.181	2.170	0.005	1.490	6.718	2.427	2.426	3.806	0.774	2.248
December	12.500	sp'kl	7.070	13.410	1.540	1.150	2.000	2.396	6.632	4.329	1.834	4.282	8.637	2.327	1.815	7.867	0.364	9.511	12.850	2.612	5.156
	1850....	1851....	1852....	1853....	1854....	1855....	1856....	1857....	1858....	1859....	1860....	1861....	1862....	1863....	1864....	1865....	1866....	1867....	1868....	1869....	
January	4.500	0.650	0.580	3.300	3.250	2.670	4.919	1.373	2.444	0.964	2.310	2.668	15.036	1.733	1.077	4.776	7.629	3.440	6.036	4.790	3.694
February	0.500	0.350	0.120	2.000	8.500	3.460	0.692	4.801	2.461	3.906	0.931	2.920	4.240	2.751	0.186	0.712	2.010	7.104	3.147	3.630	2.722
March	10.000	1.880	6.400	7.000	3.250	4.200	1.403	0.675	2.878	1.637	5.110	3.320	2.800	2.360	1.303	0.481	2.018	1.010	4.348	2.942	3.265
April	4.250	1.140	0.190	3.500	1.500	4.320	2.132	sp'kl	1.214	0.981	2.874	0.475	0.821	1.693	1.080	1.370	0.476	1.805	2.306	1.240	1.568
May	0.250	0.690	0.300	1.450	0.210	1.150	1.841	sp'kl	0.203	1.037	2.491	0.590	1.808	0.355	0.742	0.460	2.252	0.008	0.270	0.648	0.787
June	0.000	0.000	0.000	0.001	0.310	0.010	0.033	0.350	0.098	0.000	0.017	0.135	0.011	0.000	0.087	0.000	0.100	0.000	sp'kl	0.008	0.058
July	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.030	0.594	0.000	0.000	0.000	0.000	0.004	0.018	0.000	0.000	0.000	0.029
August	0.000	0.000	0.000	0.000	sp'kl	0.000	0.000	sp'kl	sp'kl	0.000	0.000	0.000	0.006	0.000	0.085	0.000	0.000	0.000	0.000	0.000	0.004
Total	36.000	4.710	17.980	36.362	20.068	18.620	13.770	10.443	18.991	16.051	22.626	15.548	35.549	11.579	7.868	22.512	17.924	25.305	32.769	16.644	20.068

Maximum quantity of rain in each month, minimum quantity in each month, and average quantity in each month, at Sacramento, since 1849.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Maximum	15.0	7.1	10.0	4.3	2.2	0.3	0.5	0.0	1.0	3.0	6.7	13.4
Minimum	0.9	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mean	3.7	2.7	3.2	1.5	0.7	0.0	0.0	0.0	0.0	0.4	2.2	5.1

Date of the first and last rains at Sacramento, and of the beginning and ending of each rainy season; also, the amount of rain which fell before the end of the year, and the amount after the end of the year, in each season.

SACRAMENTO.	First Rain.	Last Rain.	RAINY SEASON.		Before January.	After January.
			BEGINS.	ENDS.		
1849-50	September 23	May 25	November 5	April 30	16.5	19.5
1850-51	November 10	May 20	December 5	May 1	0.1	4.6
1851-52	September 6	May 17	December 19	March 31	10.3	7.5
1852-53	October 28	May 29	November 9	April 29	19.4	16.9
1853-54	September 15	June 26	November 15	April 30	3.0	17.0
1854-55	September 22	August 21	December 3	May 20	2.8	15.8
1855-56	September 15	May 22	November 9	May 22	2.7	11.0
1856-57	September 20	June 30	November 15	March 31	3.2	7.2
1857-58	October 6	June 18	November 2	March 7	9.6	9.3
1858-59	October 20	May 23	December 10	April 24	7.5	8.5
1859-60	September 15	July 17	November 3	May 25	8.3	14.3
1860-61	September 24	June 12	December 7	March 29	5.4	10.1
1861-62	October 29	August 18	November 11	May 18	10.8	24.7
1862-63	October 4	May 19	November 9	April 26	2.6	8.9
1863-64	September 19	August 24	November 10	May 17	3.3	4.5
1864-65	October 24	May 19	November 23	March 4	14.7	7.8
1865-66	September 15	July 24	November 12	May 28	3.3	14.6
1866-67	September 17	May 16	November 3	April 12	11.9	13.4
1867-68	September 14	June 23	November 19	April 13	16.6	16.1
1868-69	November 18	July 26	December 17	April 20	3.4	13.2
Mean			November 17	April 27	7.8	12.2

COMPARATIVE TABLE OF METEOROLOGICAL STATIONS ON THE PACIFIC COAST.

STATIONS.	Altitude above the sea, in feet	Latitude	Longitude	Length of period observed	TEMPERATURE. Hottest mean day	Coldest mean day	Range	Mean	Rain & snow, in inches.
		° ′	° ′		°	°	°	° ′	
Fort Yuma	120	32.43	114.36	6 years.	92	56	36	74.00	3.24
San Diego	150	32.42	117.14	7 „	74	52	22	62.00	10.43
Monterey	140	36.36	121.52	6 „	59	50	09	55.00	12.20
Fort Miller	402	37.00	119.40	5 „	90	47	43	66.00	24.51
San Francisco	22	37.48	122.27	19 „	78	37	41	56.40	21.50
Benicia	183	38 08	120.14	8 „	80	44	36	59.12	22.86
Stockton	35	37.37	121.14	4 „	72	56	16	62.00	15.10
Sacramento	74	38.31	121.29	20 „	94	32	62	60.25	20.06
Marysville	76	39.12	121.42	1 „	90	38	52	63.32	.....
Fort Reading	674	40.31	122.05	4 „	83	44	39	62.09	29.02
Aurora	7,468	38.19	119.00	1 „	82	20	62	52.00	.....
Hope Valley	7,088	38.47	119.54	4 months.	61	11	50	40.00	.....
Strawberry Valley	5,710	38.49	120.07	3 „	69	24	35	51.00	.....
Fort Jones	2,570	41.36	122.52	3 years.	71	31	40	51.40	16.77
Astoria	50	46.11	123.48	18 months.	62	39	23	50.20	86.35
Port Orford	50	42.44	124.29	4 years.	61	46	15	53.62	71.63
Red Dog (Nevada)	2,900	39.18	120.47	4 „	.....	.....	.....	.....	83.30
Nevada	2,630	39.18	120.52	1 „	72	45	27	55.75	.....
Shingle Springs (El Dorado)	1,450	.....	.....	1 „	.....	.....	.....	.....	50.30
Vacaville (Solano)	.....	38.20	122.00	1 „	86	37	49	53.25	24.18

AUSTRALIA.

[Notwithstanding many promises of a connected Report from Australia, only the following fragmentary contributions had arrived up to the time of going to press.—ED.]

As a further contribution to the subject of his previous observations and writings, Professor Halford, of Melbourne, read a paper at the Medical Society of Victoria, June 1st, 1870, on the treatment of snake-bite in Victoria. After relating a series of twenty cases, he said:—

"The treatment that I have recommended is that of injecting dilute Ammonia, say, at the least, 30 minims of the Liquor Ammoniæ B.P. sp. gr. ·959 into a superficial vein. If properly injected, the vein having been first exposed, and its coats pierced with the nozzle of the hypodermic syringe, the alkali soon reaches the heart, vigorous contractions follow, blood that was recently stagnating in the capillaries passes on, cut vessels which had ceased bleeding, bleed afresh, the temperature rises, the colour improves, the muscles contract, the sensory ganglia respond to external impressions, the nearly or quite inanimate mass is now animate. Light and sound are perceived, the faces of friends are recognised. This is no exaggerated picture, but such as I have myself witnessed. . . . . .

"The remedy, then, is Ammoniacal Gas in solution, an old and favourite one for snake-bite the world over; but instead of putting it into a stomach, the stagnating vessels of which cannot absorb . . . I inject it into the blood itself; the gas, experiencing a rise of temperature, expands, and presently is in direct contact with every tissue in the body, the capillary walls alone intervening—in fact, it becomes both a central and peripheral stimulus, so powerful that as yet no soporific tendency has counteracted it; none of the comatose states of snake-poisoning have failed to be removed by it; *but, as its power is expended, fresh supplies must be brought.* It does not act as a transitory stimulus to the heart, it maintains vigorous pulsations for at least twenty minutes or more, frequently requiring no repetition. Its presence in the nervous system and muscles is shown by the resulting animation; there is also a rise of temperature. It is presumable, therefore, that oxidation is going on in the blood, where before there was little or none; that the abnormal molecular changes going on in the blood are

arrested; that electrical action results; and that the capillaries of the muscular system, the whole body over, are inducing to form heat or excite motion—the wheel of life is turning again, so lately on the point of stopping—for the muscles are now recognised as nothing but machines for the conversion of heat into motion; the determining and directing power residing in the nerve-tissue; the fuel in the blood. It might be asked, Is it possible that the Ammoniacal Gas, under the influence of electric forces within the body, may be decomposed, that its hydrogen and the active oxygen in the blood may be condensed to form water? If so, the quantity of hydrogen contained in one half-drachm syringe would yield heat which, by transformation into muscular energy, would enable the patient to raise his own weight his own height. But, indeed, we know little of the molecular actions and reactions taking place in living organisms, and it is difficult to say what is the destiny of Ammonia thus introduced into the blood. But it is also as difficult to trace its functions in, and depositions from, the sap of plants; and yet we know that it stands in as important a relation to both plants and animals as heat itself. It is the source of all the nitrogenous elements of both, the reactions between which and the external forces constitute life. Thus much, however, we can say, viz., that just as the sounds emanating from a musical box are the result of a force communicated from without, so are the signs of animation proceeding from a patient previously insensible, as in these cases, the result of a force communicated from without, potential in the syringe, active in the body.

"The lessons we have learnt from those who have used this remedy and have sent their cases for publication to me, are that a good battle must sometimes be maintained ere recovery ensues. As with every other remedy, the amount required must depend, be judged of, by the effect produced; the great fear is that too little, rather than too much, will be injected. *The greatest care should be used that none of the Ammonia is spilt, or sloughing will follow;* but if the canula of the syringe be properly introduced, and the injection be forcibly made so as to mix the Ammonia immediately with the blood, I believe none will follow. A little inflammation may result, but what of that if the patient be saved?

"As symptoms of recovery instantaneously follow the use of Ammonia in this way, we are saved the prolonged anxiety attending former treatments.

"Objections have been made to the value of this treatment, on the supposition that Australian snakes are not venomous, or at least not dangerously so. Now, the cases brought forward to-night are a sufficient refutation of such errors. I find, from public records, that in some instances our snakes are as dangerous as those of India, and certainly quite as deadly as the Rattlesnake. Thus Underwood, a snake-charmer, was bitten at 7.30 p.m., and was dead by 8.30 p.m.; that is in one hour. Cartwright, another exhibitor of snakes, was bitten some time after 3 p.m., by 3.30 p.m. he was insensible, with fixed, dilated pupils, and at 4 o'clock was dead; that is within one hour. One case has been communicated to me by Mr. Casey, surgeon, of Melbourne, of death within

half-an-hour. There are many cases on record of deaths considerably within twelve hours, and to live beyond twenty-four hours is rare—that is, when the case ends fatally. And, indeed, except in size, and length of fangs and quantity of poison, the cobra differs little from our tiger-snake (*Hoplocephalus curtus*), which, like the cobra, erects itself, dilates the neck, and, in confinement or at bay, is very vicious. *Hoplocephalus superbus*, another beautiful species, is exceedingly dangerous. This is popularly called the diamond snake, just as in many parts the tiger-snake is called the carpet snake; but the true diamond and carpet snakes are both harmless. Next we have the common brown snake (*Diemenia superciliosa*), which, although it does not expand the neck like the cobra, is yet, according to Professor M'Coy, in size and structural affinity, closely allied to it. The bite is very deadly. The black snake (*Pseudechis porphyriacus*) is also very common in some parts, and very deadly. It, according to Mr. Gerard Kreft, of Sydney, 'raises about two feet of its body off the ground, flattens out the neck like a cobra, and then darts at its prey or enemy.' The same authority states that animals, such as dogs and goats, die usually within one hour from the bite of any of the above species. I have experimented chiefly with the Tiger Snake (*Hoplocephalus curtus*), and have obtained the same results; but in one instance one of my Tiger Snakes killed a dog in seven minutes. I have inoculated with the poison of all but the Black Snake, and find them equally deadly.

"Further, I feel certain, from my own actual experiments, that equal amounts of poison from either American, Indian, or Australian snakes, are equally pernicious, if introduced into the blood."

On August 27th Professor Halford supplemented his paper of June 1st, by the following important appendix:—

"In former papers communicated to this Society I have dwelt particularly on the vast numbers of white cells seen in the blood after death from snake-poison. Subsequent and repeated observations have confirmed my original description equally of the growth, size, and maculated condition, under the influence of magenta, of these bodies; but lately my friend Mr. Ralph, surgeon of Kew, near Melbourne, has discovered a nearly similar condition of blood in animals poisoned by prussic acid. I have confirmed his observations, and most probably such bodies will be found and arise wherever after death coagulation of the blood does not take place. The whole subject, therefore, requires reconsideration. The facts are as I stated, but possibly have relations hitherto unknown to me.

"From the first, I stated these white cells arise in a structureless molecular matter, nucleus first, cell-wall after; and that in some manner they take the place of what is called fibrine, and, further, that the higher the thermometer for the time being, the more numerous and larger were these bodies.

"The changes, therefore, take place when the blood is stagnant, but still retained within the veins.

"Now it is fortunate that I can direct the attention of this Society to some other phenomena in the growth of cells as observed by Dr. Onimus and recorded in the 'Journal de l'Anatomie et de la Physiologie," 1867, and just received in Melbourne. He disbelieves in the doctrine of Virchow that *omnis cellula e cellulâ*, and holds that *cells arise in an amorphous blastema.*

"This agreeing with the origin of the white cells I have described, let us follow Dr. Onimus in his experiments and conclusions.

"The fluid from a recent blister was filtered so as to obtain a fluid containing no kind of form, neither white corpuscles nor epithelial scales. This fluid was enclosed in small tubes of gold-beaters' skin, and placed beneath the skin of a live rabbit.

"After two hours—the serum was still transparent, although it had lost its primitive citrine colour. In it were seen a few white cells and granules.

"After 24 hours—the serum was turbid, and contained a great quantity of white cells and granules.

"After 36 hours—the serum was quite white, milky, and composed entirely of white cells and granules. The white cells having all the characteristics of white corpuscles of the blood.

"Increase of animal temperature aided the production of the white cells.

"*No white cells, nor any sort of anatomical element was formed in the serum of blisters, from which the fibrine had coagulated.*

"*The presence of white cells artificially added to serum from which the fibrine had separated, had no effect in causing further development of white cells.*

"It is certain, therefore, there is some relation between the growth of white cells and those elements which by their separation from the liquor sanguinis constitute fibrine.

"It will be remembered that I referred all the morbific agency to the microscopic germinal matter found in snake-venom, and not to any fully formed cells. Dr. Onimus observes that in infectious diseases, miasmatic or virulent, changes are not found on the side of elements having form, but in the composition and properties of the plasma. The white cells of the virulent pus of a chancre resemble those from a healthy sore; it is in the serum that search must be made for the difference in the properties of the two purulent fluids.

"It is, however, possible, that with increased microscopic power, and more time for such labours, modifications of form and property may even be recognised in the molecular matter of serum.

"Now, it has been maintained by some, and by Dr. Weir Mitchell, of Philadelphia, whose writings on snake-poisoning deserve and have my willing respect, that nothing like germinal matter exists in snake venom. I cannot agree with him.

"But I have always stated it exists in a very microscopic form, and that to this minute elementary germinal matter the activity of the venom is due. Since this was stated by me, similar con-

clusions have been arrived at by M. Chauveau (Comptes Rendus, 1868) of the nature of the vaccine virus, which he describes as consisting of—first, the serum, an albuminous fluid, holding the various soluble substances in solution; and, secondly, the solid elements, consisting of white cells and of elementary granules, both of which are suspended in the serum.

"After separating the white cells, the remainder was as virulent as ever, and the clear serum was found to be harmless; but in the elementary granular matter dwelt the activity of the virus.

"I hope this short and imperfect communication may induce others to think on the correlation of the animal poisons."

"*Experiments performed with the assistance of* DRS. NEILD *and* WOOLDRIDGE, *to show the action of Ammonia upon the central organ, and that it may not only be injected into the veins but into the heart itself without injurious effects, and also that it counteracts in a most powerful manner the lethal influence of chloroform.*

EXPERIMENT I.

"A large young dog was got under the influence of chloroform, the front of the chest was removed and artificial respiration maintained; chloroform being occasionally dropped into the bellows.

11.27 a.m.—Half a drachm of Liq. Ammoniæ B.P. sp. gr. 0.959 was injected into the left external jugular vein. The heart's action was at once accelerated, but soon settled down to steady pulsations.

11.35 a.m.—Half a drachm more was injected into the right ventricle. Immediate increase of the heart's action ensued. Consciousness returning, as evidenced by the reflex movements of the eye-lids, and by a withdrawing of the leg on pricking the foot. Pulsation powerful and steady.

11.45 a.m.—Completely conscious, struggling to get up. More chloroform was poured into the bellows. Soon become insensible again.

11.50 a.m.—Half a drachm was injected into the left ventricle. This was almost immediately followed by a contraction of all the muscles of the body, which soon subsided. Heart's pulsation very vigorous.

11.53 a.m.—Dog returning to consciousness; more chloroform poured into the bellows. Soon again insensible.

12 noon.—Half a drachm more injected into the left ventricle. The same increased pulsation, followed by slight universal spasm as before.

12.2 p.m.—Dog quite conscious and struggling; more chloroform poured into the bellows.

12.11 p.m.—Dog again conscious and struggling; more chloroform poured into the bellows.

12.13 p.m.—Again quite insensible, pupils dilated, &c.

12.17 p.m.—Half a drachm more Ammonia was injected into

the right ventricle. Heart pulsated forcibly, the same general spasm following.

12.22 p.m.—Dog again conscious; more chloroform by the bellows.

12.26 p.m.—The dog being again quite insensible, I injected half a drachm more into the right jugular vein. In ten seconds the heart's action was increased, the same general muscular spasm following. Sensibility returning as shown by the reflex action of the eye-lids, &c.

12.33 p.m.—Quite conscious and struggling to get up; more chloroform in the bellows; soon again insensible.

12.36 p.m.—Half a drachm more injected into the left ventricle. Pulsations immediately increased, followed by the same general spasm, but in a milder degree.

12.40 p.m.—Heart's action powerful and steady; pulsations good all over the body.

12.43 p.m.—Dog again quite conscious; more chloroform given; soon insensible.

12.48 p.m.—One whole drachm was injected into the left ventricle. Heart's action immediately quickened, followed by the general spasm. Reflex action of eye-lids returning.

12.57 p.m.—Dog quite conscious and struggling hard to get up. He seeming to have as much vitality as ever, and a sufficient trial having been made, the heart was cut out and an end put to the experiment.

"On examining the cavities of the heart, there was not the least trace of irritation or inflammation, and the punctures through the muscular substance were scarcely visible. The vigour and persistence of the heart's contractions after removal from the body were greater than I had ever before witnessed.

Experiment II.

"Another large dog was chloroformed, the front of the chest removed, and artificial respiration maintained for one hour and twenty minutes, during which time the heart's movements were carefully observed. As in the former case, the injection of the Ammonia had the effect of continually rousing the dog from the full influence of the chloroform, necessitating always a further supply of the anæsthetic before another quantity of Ammonia was used. In this dog both jugular veins once, the right ventricle once, and the left ventricle three times, were injected with half drachm doses of Liq. Ammoniæ B.P. sp. gr. 0.959. The results were precisely similar to those noticed in the other dog, viz., immediate increase of the heart's pulsations, settling down into steady beats. The same muscular spasms followed by returning consciousness, and lastly the same absence of any visible injury to the heart's cavities or walls."

Dr. Bird, of Melbourne, read a paper before the Medical Society of Victoria, April 6th, 1870, for the purpose of reiterating and

supplementing the opinions expressed in his work on Australian climates, published in 1863. He says:—

"The proposition that I have endeavoured to illustrate in my work on the Australian climates is, that the grand *sine qud non* in the treatment of all cases of phthisis being change, the change should be to a climate as dissimilar as possible to that in which the disease originated, and at the same time negativing the ordinary conditions under which tubercle and scrofula are wont to develop themselves in the climate where the patient has been residing. I have endeavoured to show that the climates of these colonies in general thoroughly fulfil both these indications; and also that if it is necessary to enter into the minutiæ of climatics, we are equally 'all there,' for we can supply as great a variety in the way of dampness and dryness, heat and cool, as can be found in any of the health resorts of Europe. I have nowhere asserted that the voyage hither must necessarily be beneficial—merely that in the large proportion of such cases it is.

"The work in question appeared in the autumn of 1863, nearly seven years ago, and each year since has brought to these shores an increasing number of persons in various stages of disease, most of them sent out by the express advice of their physicians in the large towns of Great Britain and Ireland. Scarcely a ship comes into Port Philip without two, three, or more such. Now what does this mean? What are we to suppose when a remedy is, year after year, prescribed to a greater number of patients by the leading physicians of the day? Why, either that those physicians have gone mad and are playing *felo de se* with their own reputations, or that the remedy is a tried and successful one. I do not deny that most inappropriate cases are sometimes sent here; I think it quite probable that doctors at home occasionally say 'Go to Australia' as a last resource, when they do not know what else to recommend; but despite these, which are the exceptions, I must unhesitatingly affirm that I have seen more cases of absolute recovery from tubercular disease of the lungs in any one year of my residence in this colony than I ever *heard of* in Europe. There is hardly a physician of any eminence in London, Edinburgh, Dublin, or any of the large towns of the kingdom, from whom patients are not constantly being sent to these colonies as the most probable means of arresting tubercular disease. . . . . .

"Apart from other people's opinions and experience of the effects of this climate on consumptive patients coming from Europe, what do we see and know of the results of such a change ourselves? Now, I think I may be allowed to speak with a certain degree of authority on this matter, as I believe nine-tenths of the chest-cases coming from Europe pass under my hands at some period of their stay here, and therefore I may be supposed to be more conversant with the statistics of the subject than those whose practice is more general than special. I say this without egotism or vanity, but simply as a shoemaker might with justice claim to know more about leather than a tailor or a carpenter, for the plain reason that it is more in his line. Now I endeavoured for some time to keep

notes of these cases, but found that reliable statistics were not obtainable, because all patients would not take the trouble to correspond with me after leaving here, and therefore I am necessarily unable to know in all cases the results of their residence and treatment here. Numerical deductions must therefore be wholly fallible. But the results in the large number of cases which I have been able to trace have been such as to not only justify but amply confirm my first impressions as given in the work referred to. Were it possible, I would bring before you scores, nay hundreds of persons who came to these shores within the last eight years with confirmed tuberculosis, some with vomica in one or both lungs, who are now enjoying fair, good, or even perfect health, as residents in various parts of these colonies. Many of these have continued the identical occupation in Melbourne under which these symptoms originated in the large towns of the United Kingdom. I would engage to produce (would the patients themselves permit it) more cases of indubitable arrested phthisis in Melbourne at this very time, the result of the change from Europe, than are shown in the much-praised statistics of Dr. Williams during his thirty-six years' experience. Of course no human prescience can foretell when the symptoms might re-appear under exciting conditions, but I mean cases where all morbid action has ceased, the natural weight, or something near it, has been regained, and the patient is able to perform all the duties and enjoy all the pleasures of life. Many of our leading professional men and merchants, who now go by the name of 'old chums,' were sent out here with phthisical symptoms. It is seldom that there are not two or three well-known clergymen from home in our pulpits, preaching with a vigour which they had little hope of regaining when they left Europe. I am not ignoring the fact that many cases of phthisis so arriving get worse, and die here or go back to die. How can it be otherwise? This must be a fatal disease, under whatever circumstances, to a considerable proportion of those attacked. What I am contending is, that we see far more cases of recovery here than we ever did in Europe. But if the change to this climate is in a vast majority of cases the most potent alterative that can be used to arrest phthisis originating in Europe, it is also easy enough to show that, in itself, this climate is deficient in those faults and peculiarities which aid so much in the development of the tubercular diathesis in Northern Europe. All statistics of general hospitals and of the mortality of centralising populations like ours are fallacious to a degree when called upon as witnesses in the cause of climatic influences on disease. As has been truly enough said, a large proportion of the deaths from phthisis in this country now are hopeless cases sent from Great Britain. Unless these can be sifted out, no correct deductions can be drawn. The influence of colonial life and manners, particularly spirit-drinking to excess in a warm, dry climate, the unaccustomed excitements of a gold-producing country upon minds used only to the humdrum dead level of English country life, are disturbing elements which interfere greatly with our appreciation of the actual climatic influences *per se* apart from all alterations of social condition. . . . . .

"The most successful application of the grand principle of effective change is seen in the removal of phthisical patients from North-Western Europe to Southern Australia; but we may apply it to the same disease originating here. An inland settler will, probably, benefit more by a voyage to Europe and back than by any other remedy you can prescribe; a consumptive resident in our southern littoral by wintering in the far interior on the plains of the Darling and Murrumbidgee, which have a climate both as near perfection in winter as any climate can be, and also offer a striking contrast to that of the sea-coast. . . . . .

"Patients arriving here at any time between April and October I always counsel to go at once northwards inland, beyond the Dividing Range to the plains of the far interior, where the winter climate is to be described in any other terms than heavenly. I impress upon them every minute spent under a roof of any kind is time lost in their treatment, and that they should eat, drink, talk, drive, ride, and, if need be, sleep in the pure, dry bracing air. The results are sometimes miraculous. . . . . .

"In summer, the bracing southerly breezes of the coast, or the highlands of Gipps Land or Tasmania; in spring and autumn, the neighbourhood of Melbourne. Such variety cannot be had in Europe without traversing the whole length of the continent, three or four times our Australian distances, and we have steamers and railroads as well as other people.

"That these colonies have for many years held a high reputation for salubrity, and as a suitable residence for consumptives from Europe, and that this reputation is well-founded is evident from the fact that all the leading physicians in the home country continue to send patients hither in increasing numbers, as the means of communication are facilitated, which they certainly would cease to do did they not find favourable results from so doing."

Dr. Thompson, of Melbourne, has published his views upon the climate of Australia and its influence upon phthisis,* comprising the following among other statements:—

"Taking two years as a fair average period, during 1868 and 1869, it has been found that 520 cases of phthisis and hæmoptysis were admitted for treatment into the Melbourne Hospital. Every fifteenth admission was a case of one or other of those two affections. These were irrespective of a vast unnumbered crowd of phthisical out-patients, of whom no record is kept. They were also, it need scarcely be said, over and above all other cases of affections of the respiratory organs, besides a large number of cases entered as 'lung disease' apparently defying diagnosis during life or after death. . . . . .

"Only an insignificantly small proportion of those deaths in the

* "On Phthisis and the supposed Influence of Climate, being an analysis of statistics of Consumption in this part of Australia, with remarks on the causes of the increase of that disease in Melbourne." By William Thompson, L.R.C.S. Edin. Melbourne, 1870.

hospital were newly-arrived persons; by far the larger portion having resided in the colony for many years, mostly long enough to test fully the influence of this climate, beneficial or injurious, in curing, causing, preventing, hastening, or retarding phthisis, were any such influence in existence. The following details have been taken with scrupulous care from the hospital register:—

"*Table of the length of residence in the Colony of all Phthisical Patients admitted into the Melbourne Hospital during the years* 1868—9.

Length of residence.	No. admitted.	No. of deaths.
Born in the Colonies	43	of whom 20 died.
Aboriginals	2	„ 1 „
Of whom no particulars were given	8	„ 6 „
Number who had been less than two years in the Colony	45	„ 21 „
„ „ between 2 and 10 years	123	„ 72 „
„ „ „ 10 „ 20 „	184	„ 100 „
„ „ „ 20 „ 30 „	31	„ 11 „
„ „ over 30 „	6	„ 3 „
Total admissions	442	234

"Any assertion, therefore, to the effect that nine-tenths of the deaths from phthisis are of recently arrived immigrants would be wholly incorrect. Not one-tenth is so. The reports for the two years referred to show, as already stated, about one case in every fifteen admissions to be of phthisis; that fully one-half of the phthisis cases were fatal; that these fatal cases gave above a fourth of the total hospital mortality. They further show that of the 234 deaths from phthisis during these two years, nearly 7 per cent. were native-born Australians; that one was an aboriginal; that 8 per cent. had been one year in the colony; and that the large majority of 85 per cent. had been on an average of twelve years in the Australian colonies; their average ages being thirty-two years. . . . . .

"The metropolitan hospital is not singular in its history of phthisis. In the general hospital of the Bendigo gold-fields district every eighteenth admission is of a phthisical patient; and in the year 1869, of all such cases, more than one-half died. The Bendigo district is about 100 miles inland, beyond the Dividing Ranges, away from littoral influences. It has good elevation, no marshes, and, from the geological formation (Lower Silurian), the red sandy or gravelly soil admits of free natural drainage. There are, besides, none of the usually supposed special causes of phthisis, such as factory or other kinds of sedentary labour, unless gold-mining belong to the category. Yet, with great wide-spread wealth, ample food, both animal and fresh green or white vegetable, brilliant, nay glowing sun-light, dry or rather arid surface of the ground, with thorough sub-soil percolation, no cellar dwellings, free scope for open air exercise, and more than all, with abundance of ozone, there is, nevertheless, a large amount of phthisis. What, it may well be asked, can those conditions be which, as exciting causes of phthisis, are thus common to communities differing so

widely in geographical position, climate, and industrial pursuits, as Melbourne and Sandhurst? The contrast and parallel may afford enough of the recondite to awaken others than mere enthusiasts to thoughtful inquiry, to find out, if possible, the subtle modes of action of this wily destroyer of the race, under theoretically the most propitious of Australian climates. It will be found that these modes of action of the causes of phthisis are associated less with localities or climates, or atmospheric or telluric changes, and more with accidents of former diseases, or with personal habits, wrought in by social customs, or bound in the hard lines of civilised servitude. The most recent advances of pathological science go farther than ever to prove that phthisis is a result of causes acting within the body, rather than of forces operating from without. The diseases which, uncured, entail a proneness to phthisis, are endless in number and of all degrees of severity. The bad personal habits that often induce it are essentially diseased conditions, and range from one extreme of fatiguing industry, where over-wrought body or mind is unrefreshed by rest and food, to the other extreme, and like result, of exhaustion from grovelling depravity or secrets of still viler excesses. But whether the weakened vital powers which always mark the inroads of the disease come from those habits, or from other equally well-known affections, tending to impair healthy energy, and which need not now be enumerated, it is the proper function of medical science to explain. And if medical science can so elucidate the true causes, it will afterwards become the exigent obligation of social science to enunciate the truth, as an aphorism if need be, that neither sunny sky, dry air, high lands, drained fields, nor all that riches can buy, provide any safeguard for him who persists in abusing in his own person the primary conditions of health, or in whose system linger the relics of previous morbid states. It is only fair to warn the unwary, how insidiously any of those varied causes induce the diseased state, or, as it is often called, depraved nutrition, known as tuberculosis. To impress a due sense of the risk upon people generally, it is not the wiser method to ascribe recovery from phthisis, when recovery ever really comes, to some inscrutable climate influence, while to an assumed vicious life is attributed every fatal termination. . . .

"There is, however, another public institution situated in Melbourne, the records of which would likewise have been closely examined, but for one good reason. That institution is the Benevolent Asylum. At one period there was an enormous mortality in it from phthisis. In one year, over 70 per cent. of the total deaths being from that cause. The institution seemed gradually passing from its original purpose to a hospital for incurable cases of consumption. Several members of the committee of management objected to this transition, and, strenuously advocating the project for a separate hospital for those cases, insisted on refusing admission to a great number. By this means the mortality was greatly lessened, and has continued at a lower rate ever since. But it is still very considerable. By a cursory examination it is found that during the last eleven years, 1859 till 1869 inclusive, there have been 392 cases of phthisis under treatment,

of which 157 died. The total deaths from all causes were 692, of which number 157 from phthisis would be over 22 per cent. Thus, even in an institution jealously watched against the intrusion of phthisical invalids among the destitute, it is found that nearly 1 in 4 have died of that disease. . . . . .

"If general hospitals, in all parts of the country, are to be condemned as unsuitable places for the best treatment of patients afflicted with phthisis, special hospitals should forthwith be provided. The exigency arises from the rapid growth of the disease. Hospitals of the kind must not, however, be special in the sense of gathering large numbers of patients together, for medical convenience, tentative treatment, or false notions of big-hospital economy. They should rather be smaller homes, where rest and peace and plenty could be frugally combined, since in these three things reside the main secret of the cure, if any cure there really be, for the vast majority of cases of true pulmonary consumption. Such retreats for phthisical invalids become daily a greater want. That they should be cottage hospitals, in the most rustic sense, is admitted. In them alone are combined all the ameliorating conditions. It has been noticed that out-door patients derive more benefit than the in-door patients, at the best large hospitals for consumption. . . . . .

"We come thus to consider how far the excessively high hospital mortality is to be regarded as an unerring indication of the health-status of the bulk of the community in respect of phthisis. The test comes out clearly on scrutinising the entire vital statistics. As it is within the hospital, so is it without. Hence the singular utility of watching the hospital death-rate. Year by year it increases, keeping pace *pari passu* with a yearly increase among the general population, as is completely demonstrated by the subjoined comparison of returns for a series of years:—

Table showing the gradual annual increase of Consumption in Melbourne and suburbs during the last four years.

Years.	Population.	Deaths from all Causes.		Deaths from Phthisis.		
		Total Number.	Number per 1,000 of Population.	Total Number.	Number per 1,000 of Population.	Per centage of Deaths from all Causes.
1866	164,787	4,203	25.51	342	2.08	8.14
1867	170,269	4,207	24.71	376	2.21	8.94
1868	174,663	3,800	21.76	379	2.17	9.97
1869	180,000	3,832	21.29	454	2.52	11.85

Mean of four years, 23.75 deaths from all causes per 1,000 of population.

"The same ratio of mortality from phthisis is still steadily progressing. During the four months of the present year it is more than maintained. In March 1870, of 388 deaths from all causes, 51 were from phthisis, or 13.3 per cent., being one per cent. above the London yearly average, according to Dr. Farr, 12.5 per cent. Yet March is considered one of the most favourable months for the consumptive invalid in or around Melbourne and vicinity. In calculating these comparative rates of the general mortality, and the special phthisical death rates, it should be explained that the aggregate area of the Melbourne districts, from which the returns are made up, is larger than the aggregate area of the London districts. The former contains 165,000 acres, the latter only 77,000 acres. And while the former contains a population of only 180,000, the latter contains 3,000,000. In the one place there are just 700 inhabitants to every square mile; in the other about 25,000. A sparse population and a dense one, and yet the greater mortality is where there should be less!

"The same holds good on comparing Melbourne with other large cities in England. In Bristol the death-rate is 23 per 1,000 living; in Birmingham and Sheffield, above 24; in Hull, 25; in Liverpool it was nearly 30; and in Manchester, as high as 31.4; in Glasgow it is perhaps higher still. The proportion of inhabitants to the square mile can easily be calculated; but surely in Liverpool with its cellar dwellings, and in Glasgow with its garrets, the ratio must exceed even the ratio of London density. It would, hence, be fairer to compare Melbourne with all England, than with any one densely peopled city, because in England there are about 350 persons to every square mile, which, being just half the rate in Melbourne, is certainly much nearer than the 25,000 or more, in those above-named cities. However, with all its advantages of space, parks, and widely scattered suburbs and rural districts, it shows as badly as all but the very worst of England's overcrowded cities. In Manchester, although there is a higher death-rate, yet the rate from phthisis is under 12 per cent. Nay, further, it appears that of the total mortality in England, about one in three of the adult population die of phthisis. This statement is made by Dr. Guy, Professor of Public Hygiene in King's College, London. As he does not specify what is meant by an adult, the age not being defined, any precise comparison is impossible. But, taking adult age at from 20 to 45 years, it is found that in Melbourne, of all deaths between those ages, about one in three are from phthisis. The exact number is 1 in 3.18. For the whole colony of Victoria, the exact number is 1 in 3.7, or more than 1 in 4. Neither Melbourne nor the whole colony seem therefore to have any vast advantage over England in this comparison. Practically, in fact, if judged by this test, they are about equal as to salubrity; climatic influence must therefore be set aside, and an explanation of the facts be sought for in other causes. . . . . .

"In England and Wales, the total deaths from all causes, during the year 1866, were 500,689; of that number 55,714 were

caused by phthisis;* being 11.12 per cent., against the 11.85 per cent., with us. By a different calculation it will be found that in England and Wales, there are 2.63 deaths from phthisis in every 1,000 persons living, whilst here, in this colony, there are 2.52 per 1,000 from the same cause. The annexed tables explain this at a glance. They are copied with the utmost fidelity from the returns of the Registrar-General, and have been cautiously verified under his observation.

"*Table comparing the Increase of Consumption in Melbourne and Suburbs with the Decrease in England and Wales.*

MELBOURNE AND SUBURBS IN 1865.

Total population, 160,000.
Total deaths, 4,071, from all causes.
= 25.44 deaths per 1,000 of the population.
or 2.544 „ per cent. „ „
or 1 death in every 39.30 persons living.

Total deaths from Phthisis in 1865 = 355.
= 2.22 „ „ per 1,000 of the population.
or .222 „ „ per cent. „ „
or 1 „ „ in every 451 persons living.
or 87.202 „ „ per 1,000 deaths from all causes.
or 8.72 „ „ per cent. „ „
or 1 „ „ to every 11 „ „

MELBOURNE AND SUBURBS IN 1869.

Total population, 180,000.
Total deaths, 3,832, from all causes.
= 21.29 deaths per 1,000 of the population.
or 2.129 „ per cent. „ „
or 1 „ in every 46.97 persons living.

Total deaths from Phthisis in 1869 = 454.
= 2.52 „ „ per 1,000 of the population.
or .252 „ „ per cent. „ „
or 1 „ „ in every 396.5 persons living.
or 118.5 „ „ per 1,000 deaths from all causes.
or 11.85 „ „ per cent. „ „
or 1 „ „ in 8.4 „ „

ENGLAND AND WALES IN 1865.

Total population, 18,786,914.
Total deaths, 425,703, from all causes.
= 22.66 deaths per 1,000 of the population.
or 2.266 „ per cent. „ „
or 1 „ in every 44.1 persons living.

Total deaths from Phthisis in 1865 = 52,289.
= 2.78 „ „ per 1,000 of the population.
or .278 „ „ per cent. „ „
or 1 „ „ in every 359.3 persons living.
or 122.83 „ „ per 1,000 deaths from all causes.
or 12.283 „ „ per cent. „ „
or 1 „ „ in every 8.4 „ „

* "It has been said that 'eighty thousand individuals, most of them in the prime of life, die every year in England and Wales, victims to the single item of pulmonary consumption."—"Australasian Climates," p. 120.

ENGLAND AND WALES IN 1866.

Total population, 21,210,020.
Total deaths, 500,689, from all causes.
= 23.61 deaths per 1,000 of the population.
or 2.361 „ per cent. „ „
or 1 „ in every 42.4 persons living.

Total deaths from Phthisis in 1866 = 55,714.
= 2.63 „ „ per 1,000 of the population.
or .263 „ „ per cent. „ „
or 1 „ „ in every 381 persons living.
or 111.27 „ „ per 1,000 deaths from all causes.
or 11.127 „ „ per cent. „ „
or 1 „ „ in every 9 „ „

Thus showing that in Melbourne and suburbs the general death-rate had in 5 years decreased from 1 in 39 to 1 in 47, and the phthisis rate had increased from 1 in 451 to 1 in 396; while in England and Wales, during 10 years the general death-rate had increased from 1 in 44 to 1 in 42.4, yet the phthisis death-rate had decreased in the same time from 1 in 359 to 1 in 381. . . . . .

"By referring to table A, it will be found that of 111 deaths from phthisis in Melbourne and suburbs, during the first quarter of this year, only eighteen had been under five years in the colony; of whom 9 had been from three days to three months, one had been less than two years, and eight had been under four years; and, therefore, all the 111 except those eighteen, that is, the vast majority, had either been born in these colonies, or had lived long in them, chiefly from ten to above twenty years. By examining, in conjunction with this table, the second, table B, specifying the duration of illness, it will be observed that, while the larger number had been long in the colonies, so likewise the larger number had been only for a very brief period of that term of residence in the colonies ill. The greater number had been ill on an average less than thirty months.

"*Table A.—Number of deaths from Phthisis in Melbourne and Suburbs, in the 1st quarter of* 1870 = 111, *arranged thus to show the average length of residence in the Colony, as contrasted with the average duration of illness.*

Born in the Colonies	11
Not known	3
Under 1 year, from 3 days to 3 months in the Colonies ..	9
From 1 year to 2 years	1
„ 2 „ 4 „	8
„ 5 „ 10 „	17
„ 10 „ 15 „	26
„ 15 „ 20 „	26
„ 20 „ 37 „	10
	111

Table B.—Duration of Illness.

Not known how long ill	22
Under 1 year ill	46
From 1 year to 2 years	16
„ 2 „ 3 „	16
„ 3 „ 4 „	6
„ 4 „ 5 „	2
„ 5 „ 6 „	1
„ 7 „ 8 „	1
Some years	1
Total	111

* * * * * * *

"As these particulars are always stated in detail in easily accessible publications, it is needless to further enumerate them. As the results of this inquiry, in hospital and in private practice, the mean duration of phthisis is, as nearly as may be, the same in Melbourne as in London, Paris, and Boston. . . . . .

"If the disease continue increasing at the same rapid rate, it will ere long exceed the great phthisical Massachusets, at the present time the most consumptive community in the whole world. That depraved physical condition will surely be the climax of unenviable fame for the capital of whilom Australia Felix! . . .

"There is more consumption amongst female domestic servants in Melbourne, in proportion to the whole deaths from that disease, than there is in London. It is therefore obviously neither cellar kitchen, nor climate, that induces the disease, but necessarily some other condition common to domestic servitude, equally potent in London and in Melbourne; more potent in fact in the latter place. What that condition is, remains to be found out. Meantime, the assertion must be proved by numbers, for which purpose the following tables, collated from the register of the Melbourne Hospital, are explicit enough:

"*Return of the total number of cases of Phthisis and Hæmoptysis treated in the Melbourne Hospital, during the years* 1865-6-7-8-9 *; showing the relative numbers of males and females, and the proportion of female domestic servants, and the number of deaths among them.*

Total Admission of Phthisis Cases.			Number of Female Domestic Servants treated.	Result.
904	Males,	549	307	172 died.
	Females,	355		135 were relieved.
				none were cured.

"Of the 355 females entered for treatment during the five years, it appears then, that 307 were stated as being domestics. These, with the others, may be classified thus:—

Number of Females entered for treatment.	Domestics.	Tailoresses and Needlewomen.	Artiste.	Labourers.	Not known.
355	307	10	1	5	32

"In a table at p. 67 of Dr. Payne Cotton's 'Treatise on Consumption,' 2nd edition, showing upon 1,000 persons treated in the Brompton Hospital, London, the relative frequency of consumption in persons of various occupations, there are of domestic servants

129, and of dressmakers, needlewomen, and milliners 78. In Melbourne, while 307 out of 904 persons were female domestics, in London, 129 out of 1,000 persons belonged to that class. Surely this is sufficient answer to the many mis-statements of the case. But some aver that many females who are not strictly what can be called domestic servants, are for convenience entered under the familiar designation; to which it may be replied, that even if 200 of the 307 were persons of no fixed employment, but engaged in household duties, the relative proportion of actual servants falling victims to phthisis would still be larger here than in London. What will clearly prove this large allowance for mis-entry uncalled for, is the youthful average ages of the female patients. This average was in the 307 exactly 28 years, there being 210 under 30 years of age. These ages pretty clearly indicate the true class to which these patients belonged. They were not, as has been suggested, mostly old char-women, nor broken victims, of dissolute lives, but evidently *bonâ fide* female domestic servants, in the strictest meaning of the term. . . . . .

"The statistical returns of all the deaths from phthisis in Melbourne and surrounding districts during the first quarter of this year, when closely analysed, show that here, as in England, the majority of the patients are males, and that the larger proportion had followed in-door occupations. The duration of the disease also appears to be as nearly as possible the same. Is is therefore exceedingly probable, that other points which cannot be subjected to such scrutiny also agree; and that the disease is prone to attack the same parts of the lungs and to follow similar general laws as in Europe. The vague assertions about its being less constant to its usual seat at the upper lobes, the rapidity of the advanced stages, the proportion of hæmoptysis, would no more stand the test of close examination than any other assertions so clearly disproved by statistics. . . .

"If these details were closely gone into, it would be found in private, as in hospital practice, that there is not one whit of difference in the histories of the average run of cases of phthisis here and elsewhere. The disease is absolutely unaffected in the smallest degree by any climatic conditions. . . . . .

"Dr. Parkes, in his work on 'Public Hygiene,' p. 96, 2nd ed., assures us, on the authority of Dr. Baly, the former distinguished physician to the Millbank Penitentiary, that 'the great mortality which formerly occurred from phthisis, seemed to be owing to bad air, conjoined with inferior diet and moral depression,' or precisely the conditions so forcibly illustrated by Laennec, in his narrative of the small religious community which, from the severe ascetism, &c., was renewed thrice in ten years, owing to deaths from phthisis; and, like Baly's prisoners, always recovering when withdrawn in time from the conditions of life operating as the active causes inducing the disease. . . . . .

"*Table comparing a version, published in the 'Australian Medical Journal,' for April*, 1870, *of the numbers said to have been entered for treatment for Phthisis and Hæmoptysis, at Pentridge, with the version presented by the Resident Physician to the Prison to the Registrar General of Victoria.*

Year.	Numbers as given in the *Medical Journal.*	Correct numbers returned to the Registrar-General.
1865.		
Phthisis	4	11
Hæmoptysis	nil	15
1866.		
Phthisis	9	13
Hæmoptysis	nil	9
1867.		
Phthisis	3	8
Hæmoptysis	nil	18
1868.		
Phthisis	5	12
Hæmoptysis	nil	6
	Total cases 21	Total cases 92

* * * * * * *

"The deaths from consumption in these two prisons (Millbank and Pentridge) were just as six to one, during nine years, and these were the most unfavourable years of Millbank history, against the most auspicious period of the history of Pentridge. But there were a large number of removals from the former, for phthisis, showing the great amount of the disease engendered. Yet, with all its famed salubrity, the deaths from consumption at Pentridge amounted in nine years to 14 per cent. of the total mortality from all causes, or just one-half as bad as the phthisis death-rate among patients in the Melbourne hospital. . . . .

"By way of illustrating the utter worthlessness of all general assertions or guesses about the effect of climate, or season, or weather, on phthisis, at any rate in this portion of Australia, it may be mentioned that in March last, when no cold gusts of north-easterly winds blew, nor rigorous seasonal changes of any kind occurred, there were 51 deaths from phthisis; while in June last, with keen, bleak, wintry blasts from north-east and south-west, from Alpine snows and icy southern seas, with cold and rains and fogs, such as have not happened with like severity for many years, there were only 48 deaths from the same cause. Weather as little affects phthisis as climate can control it. Summer months, or winter months make not much difference. Steadily it proceeds, through sunshine and shower, never greatly affected by the elements.

"Another forcible argument against the climatic theory, and in support of the now obvious and far more practically useful conclusion, is derived from the statistics of phthisis among our police force. Some years ago there was published in the 'Australian Medical Journal,' a decennial report of the prevailing diseases of that body; showing that even then phthisis was the most common cause of invaliding and death. From a comparison made at that

time it was ascertained that the ratio of phthisis was greater among the force in Melbourne than in London; and the writer has it, upon the authority of the Chief Commissioner of Police, that the disease is still the main cause of disqualifying the men from active service.

"But there is another singular fact, recently ascertained by an examination of actual numbers. In the course of the last five years there have been, besides a large number known to be phthisical, though still struggling on doing duty, 14 cases of invaliding from phthisis, nearly all of whom have since died. During that period the average numerical strength of the force has been 1,100. Of this number 815 men have been stationed throughout the country, and 285 in Melbourne and suburbs. Of the 14 cases of phthisis, 12 occurred among the 285 town men, while only two cases occurred among the 815 men in the country. As the latter have little or no night duty, except the men on foot in the towns of the interior, while the former have every third week of night duty, this may partly explain the enormous difference. It therefore clearly proves that under similar individual circumstances, the very same results follow here as in London, even in an aggravated degree. This excess of deaths and invaliding from phthisis very likely arises from the impurer atmosphere of Melbourne at midnight, a fact notorious to all whose avocations call them abroad at those hours. . . . . .

"The Australasian stations have been held forth as showing the lowest mortality among the troops, though the very reverse is the fact. This can be seen in Dr. Balfour's reports, cited by Dr. Aitken, p. 1,003, vol. ii., 5th ed. It is there stated that 'the most fatal diseases of this command are the tubercular, which caused 4.67 deaths per 1,000 of [mean] strength,' and this where the general mortality was higher than in any extra-tropical station. In both particulars of deaths from all causes, and from tubercular diseases, the Australian command is the highest in the list, instead of being the lowest, as has been asserted. This striking fact, as bearing upon our argument, deserves remark: Whilst in the army the general death-rate is greatest in Australian stations, so, of that excessive rate, tubercular diseases, the class under consideration, contribute the largest item.

"In the army, therefore, as among the civil population, phthisis is, in Australia, the most frequently fatal of all diseases. . . .

"*Table exhibiting the mortality from all causes per* 1,000 *of mean strength at the following stations of the British Army.*

Stations.	Death-rate according to Dr. Aitken, from Dr. Balfour's Official Reports.
Malta	12.31
Ionian Islands	9.11
Bermuda	11.79
Canada.	9.07
Gibraltar	8.86
Cape of Good Hope	10.87
Mauritius	25.04
United Kingdom	9.35
New Zealand	13.25
Australian Continent	15.51

* * * * * * *

"The great salubrity of Tasmania is often urged in illustration of the good effect of Australian climate on invalids, though its inhabitants enjoy no unprecedented immunity from phthisis. In the year 1868, with a population of less than 100,000, and with 1,464 deaths from all causes, there were 88 deaths from phthisis, or over 6 per cent. The aggregate death-rate of 14.6 per 1,000 living was small, showing an absence of many of the ordinarily destructive diseases, but other affections of the respiratory organs were numerous. In addition to the 88 deaths from phthisis there were six from bronchitis, 66 from pneumonia, 14 from pleurisy, 15 from congestion of the lungs, and 15 more from 'lung disease.' . . .

"The population of Tasmania is rural, sparse, chiefly engaged in agriculture, following few in-door occupations, living in no underground dwellings nor in close workrooms; with no poverty, no toil, much easy indolence, and yet a good deal of phthisis. The island contains, as has just been stated, under 100,000 inhabitants; and to be as densely peopled as Scotland is, there should be nearly 2,000,000. Possessing all these advantages, it nurtures to fatal maturity more phthisis than any rural district in the north of so-called 'struma-saturated Britain.' . . . . . .

"Climate, of course, modifies vital action; that is to say, life corresponds with its external conditions; and that action varying as these conditions are normal or abnormal, thus gives rise to the well-defined climatic belts, or isothermal zones, within which some diseases are limited. But there are other morbid processes, and tuberculosis is one of them, that climatic differences do not so modify. Phthisis, like leprosy, in all its varieties has ever been found in all climes, from remotest antiquity, in all its leading features, radically one and the same unvarying disease; originating like leprosy, in definite derangements of health, and tending, in all climates, to the one inevitable issue. These two disorders are engendered in all climates, and no climate prevents the action of their special causes, nor cures the consequences. Some day there may be discovered the means of doing for phthisis what cleanliness and potatoes have done for leprosy, eradicating it by the universal adoption of some such national rites and customs as have, in certain races of men, been all but demonstrated to lead to its absolute prevention. . . . . .

"By the report on lunatic asylums for last year, it appears that the rate of increase of insanity has been from one in 940 of the population in 1859, to one in 416 of the population in 1869. Thus, insanity and phthisis, in a nearly equal ratio, increase, almost as if allied in etiology. If anything, phthisis gains on us the faster of the two. . . . . .

"Prior to the year 1858 there had not been a single death in Victoria from diphtheria. In that year there were 6, and in the following year 280. From that time it has been a frequent cause of death, and always widely prevalent. . . . . .

"Diphtheria, measles, scarlatina, whooping-cough, alike obey the same laws in this climate that they follow in England, and their relative frequency and fatality to each other and to the population,

with the peculiar sequelæ, appear, upon close inspection, to be the very same. They are not modified in any one character by climate.

"This modifying climatic influence theory is neither more nor less than a dangerous disguise to cloak ignorance and laziness. There is really no such modification of any one specific disease. All real disease follows in this country identically the same course that it pursues in other places, or communities of similar habits and modes of life. Even habits and modes of life do not at all affect many forms of disease. . . . . .

"The increase of phthisis having become more apparent since the colony grew fashionable as a health-resort, the influx of invalids is naturally associated with the swelling list of fatal cases. Many of these voyagers return after a brief sojourn. Few physicians now encourage them to prolong their stay, urging them rather to hasten back to their home and friends by first ship. That is daily growing more and more the rule of practice. The mortuary returns tell the fate of many who disregard it. . . . . .

"Strong men are for strong men's work, and in no part of the world are health and strength more needed in the battle of life than here; in few places are the frail sooner driven to the wall. . .

"Clergymen, whose impaired health from pulmonary disease requires respite from labour, are selected for charges in this colony. Some of them are heard for a time preaching with energy and vigour. But the time comes, when even they find that strong men are as much wanted in the pulpit as elsewhere. . . . . .

"Climatic influence cannot explain why the liability to phthisis should be less amongst Chinese than European residents. That it is so, appears by the following extract from a paper on the subject, by the Registrar-General, published as one of the essays on the progress of Victoria, prepared for the Exhibition of 1866. 'In nine years, there were 2,183 deaths among the Chinese, between the ages of 20 and 45 years; and of that number, 81 or 3.71 per cent. only were caused by phthisis. During the same period, there died 9,873 Europeans at the same ages, viz. 20 to 45 years, of whom 1,791 or 18.14 per cent. died from the same cause. Whether racial distinctions or modes of living, diet, clothing, or regimen generally, could account for so great a difference, might possibly, if clearly ascertained, afford some useful hint. The Chinese inhabit close small overcrowded ill-ventilated dwellings, and certain of their habits are hardly thought conducive to health, according to our ideas of its laws; but they also have many customs supposed to ward off phthisis. They eat fat and smoke opium, work hard but quick, and take plenty of rest. There, as in many other directions, anthropological studies might prove highly serviceable to medical science. There is said to be little phthisis in China, and the domestic habits may explain the reason; the extensive use of fats in cookery, and continual breathing of a strongly perfumed air; their tea-drinking, and patriarchial customs, all help to counteract other evils; for that they are poor, industrious, and dirty, should be enough to make them also consumptive. Chronic bronchitis takes the place of phthisis, as the leading cause of death.

"Neither does climate tell us why phthisis should so rarely afflict

the Jewish portion of the community. As it is elsewhere in this regard, so is it in Victoria. In the Melbourne Hospital during the last five years, there have been 78 Jews as in-patients, and not a single case of phthisis amongst them. The register has been carefully searched to verify this. In England, where a similar state of health obtains among that body, the circumstance has been explained in the 'Jewish Chronicle,' by the extreme care that is taken in inspecting the meat, that none in the least degree diseased be used as food. But other customs may contribute their share in securing the marked immunity. The copious use of oil in cookery, especially with fish, which largely absorbs it in the process, must have much effect. . . . . .

"In the year 1821, the number of deaths from all causes (in England) was 19 per 1,000 of population, six of these deaths being from phthisis; while as we have already found, at the present time the total death-rate is 23.61 in every 1,000 persons living, with only 2.63 from phthisis. That is to say, the general death-rate has increased from 19 to 23.61 in every 1,000 but the phthisis rate has fallen from 6 to less than 3 in every 1,000 persons living. Phthisis is, therefore, less than half as fatal in England within half a century. . . . . .

"By the records of the Melbourne Hospital it has been shown, that, during five years, out of 1,000 cases there was not one solitary instance of recovery. All died, or are modestly described as 'relieved,' but 'cured,' never."

MECHANICAL APPLIANCES, INSTRUMENTS, AND INVENTIONS.

Report on Mechanical Appliances, Instruments and Inventions in different parts of the world, by HEATHER BIGG, A.I.C.E.

NOTWITHSTANDING the efforts that have been made during the past year to enable mechanical ingenuity to keep pace with the researches of surgery and pathological science, it can hardly be expected that any considerable number of new inventions worthy of a place in this report have been devised in the brief period over which it extends. Sufficient, however, exist to give the subject a wide and useful interest. Those valuable instruments, through the medium of which the most delicate examinations of internal structure are conducted, have been largely improved upon, as will be found by reference to the descriptions given of the different forms of aspirators, laryngoscopes, speculums, stethoscopes, etc., whilst a general progress is discernible in all those mechanisms upon the excellence of which the physician and surgeon so much rely during the practical exercise of their operative duties.

Owing to the limit assigned by the editor for bringing the observations of his literary year to a close, the numerous appliances which have been devised since the outbreak of war in France for meeting the exigencies of the wounded soldier must be reserved for next year's report. This report embodies all that is publicly known of the progress of practical and scientific mechanical aids to medicine in different parts of the world, up to June, 1870.

AMERICAN INVENTIONS.

Æsthesiometer.—This is an instrument for measuring the susceptibility of the skin over given surfaces or spaces. It consists of a pair of compasses, across the centre of which a graduated rod is affixed, enabling the operator to accurately determine over what area the skin relaxes its sensibility to touch. It is intended for examination in cases of paralysis, and kindred disorders of the nervous system. Dr. Clymer mentions it in his lectures, the

original idea of the instrument being due to Dr. W. Ogle, of London.

Artificial Leech.—So great is the repugnance to the presence of a leech felt by delicate persons, that anything which successfully imitates natural action may be regarded as a great boon. Dr. Andrew Smith has suggested the employment of small tubes, from which the air has been excluded and a vacuum created by the heating of ether. His plan of procedure is first to incise the skin by a scarification, which produces a small circular wound; then having placed a few drops of ether in one of the glass leech-tubes, plunge it into boiling water, thus securing a vacuum by the evaporation of the ether; finally, on placing the leech-tube over the incision, two ounces of blood may be readily withdrawn before the tube has exhausted its power of suction. The incising instrument is extremely simple, only consisting of a sharp disc rapidly turned, and, being only one-eighth of an inch in diameter, is almost painless.

Club-foot Apparatus.—Dr. Sayre, of New York, adopts an instrument having a strong leathern boot, the sole of which is made of steel, with a lateral axis just before the heel. A single outside steel bar is attached by a calf band to the leg and fixed inferiorly to the sole of the boot. Two spiral springs complete the apparatus, one drawing the foot outwards, and the other uplifting the heel. Displacement of the heel, so difficult to guard against with young children, is prevented by the tightness of the boot. The same plan has long been adopted in England, with the exception that india-rubber cords instead of wire springs have been used.

Ear-Hook.—Dr. Elsberg has devised a hook for removing foreign bodies from the ear, which consists of a tube, slightly bent at its centre, and containing two curved hooks, slightly extending from the end of the tube, and capable of being turned by the action of a screw in the handle of the instrument. These hooks bury themselves in any foreign substance contained in the ear, and readily effect its extraction.

Elastic Truss.—This appliance is intended for cases of slight hernia, and consists of a pubic pad, to which a webbing pelvic band is attached. Soft straps passing around the thigh keep the bandage *in situ*, whilst their force against the hernial orifice is assisted by springs placed within the body of the pubic plate.

Frigorific Catheter.—Dr. Youngblood, of St. Louis, has invented a catheter, the centre of which is divided by a partition in such a manner as to allow of the circulation of iced fluid driven into it by

an india-rubber ball. The object of the catheter is that of inducing low temperature in cases of urethral inflammation.

Hypodermic Syringe.—The ordinary plan of employing hypodermic injections is through the medium of a syringe having a piston. Dr. Bill proposes the adoption of two tubes of glass joined together at their centre by a pipe of india-rubber. One end is dipped into the fluid to be injected, and the lips applied until such a quantity is drawn into the tube as marks made on its side prove sufficient. Then the tube is joined to a perforating point, and the fluid blown by the breath into the wound made in the skin.

Infra-Maxillary Splints.—Dr. Bullock, of Savannah, applies a carefully-moulded grooved plate to the surface of the teeth, from the lateral extremities of which two pieces of wire forming hooks are fixed. A padded chin splint is attached to these wires by strong cord, thus keeping the fractured maxilla in position. It is a clever modification of Lonsdale's appliance so well known in England.

Ophthalmic Lens.—This is a very simple arrangement proposed by Dr. Pomeroy for fixing a lens to an ordinary lamp or gas burner instead of depending upon more complicate apparatus. It consists of a two-inch condensing lens, held by a small vertical steel rod passing through another of horizontal form, the end of which terminates in a metal clip capable of grasping the stem of a lamp. The height and distance are regulated by a milled-headed screw.

Ovum Forceps.—This instrument has been devised by Professor Loomis for removing the ovum or placenta. It presents the appearance of a pair of long forceps hinged at their centre, and having a scoop-shaped extremity. Their novelty consists in one of the blades rotating as well as expanding at the common centre. Hence, after introduction, the lateral edge of the blade can be opened and swept around in contact with the lining membrane of the uterus, enabling the operator to detach the placenta or ovum and grasp it firmly, so that it may be withdrawn with the instrument.

Patella Splint.—Dr. O'Reilly, finding in a case of severe fracture of the patella that the ordinary ring instrument failed to keep the osseous fragments in position, devised an apparatus shaped like a horse-shoe, and having the ends corresponding with the heel or calk, joined together by a regulating screw. The limb being first laid upon a ham splint, and the fragments of patella brought into contact, the toe-part of the horse-shoe is made to embrace the upper margin without inducing pressure upon the rectus muscle. A strap attached to the sides of the horse-shoe and passed under

the back of the knee keeps the whole appliance securely fixed, and prevents the least displacement of the patella.

Perforated India-rubber Vest.—This appliance is intended to be adopted in cases of rheumatism, in which warmth and free ventilation are required. It consists of a tightly-fitting waistcoat made of sheet india-rubber abundantly perforated and worn next the skin. The vest is also used for applying poultices, etc. It is made by Messrs. Haskin.

Phymosis Divulsor.—This instrument, which is intended for the forcible rupture of the mucous membrane in cases of phymosis, consists of a pair of forceps in which the upper part of the blades is set at a right angle to the lower part, their separation being regulated by a screw with the handle. It is invented by Dr. Hutchinson.

Plaster of Paris Bandage Forceps.—The difficulty of removing plaster of Paris bandages by means of ordinary scissors is so great as largely to militate against the employment of these valuable mechanical aids. Dr. Henry, of New York, has had a pair of cutting forceps made in which the lower blade has a thick wedge-shaped end, capable of being forced beneath the edge of the bandage without any risk of injury to the skin.

A similar plan was devised by Mr. Heather Bigg in England five years ago for the removal of a stearine bandage, in which the lower blade terminated in a spatula-shaped plate, easily inserted beneath the margin of the bandage, and pushing the skin away as the cutting edge of the forceps advanced.

Post Mortem Case.—Mr. Finnell, of New York, has invented a post mortem case in which the greatest possible economy of space is maintained. One general handle—itself forming both hammer and chisel—receives the cartilage and scalpel blades, also a saw. The needles are tipped at their eyes with bulbs of brass, after the fashion of the knobs on the horn of an ox, which simple arrangement greatly facilitates the introduction of the needle, and prevents any wounding of the fingers.

Pulse-Beats transmitted by Electricity.—An experiment was tried at the City Hospital, Boston, by which throbs of the human pulse could be transmitted elsewhere and at long distances. The following was the mode of carrying on this delicate arrangement:—The patient was seated in a chair, and his arm placed on a cushioned rest. The pulsation is then transmitted from the wrist to a column of water contained in an elastic tube, terminated at each extremity by a glass bulb covered with elastic membrane. One of these bulbs rests on the pulse, and the other on a lever. Each pulsation raises

the lever, and breaks an electric current, there being an ordinary electric apparatus in conjunction with the lever just named. By this simple plan the beat of the pulse of each patient under examination was communicated from Boston to Salem, and the variations thus recorded were verified in a few seconds by the usual telegraphic arrangement.

Respiratory Action Gauge.—Dr. Carroll, of New York, has planned an ingenious apparatus for stethometrically determining the measurement of the chest during the act of respiration. It consists of a slide, marked with inches and holding a gnomon or indicator. To one end of this slide an ordinary measuring tape is attached, which, having been passed around the chest, is drawn through a loop at the opposite end, thus completing the circumferential circuit. When the lungs are inflated the slide is drawn out, and the indicator at once exhibits the exact amount of expansion the thorax has undergone. This instrument has also been applied for registering the quantity of air which enters the lungs at each inspiration; but it is not so reliable for this purpose as an ordinary spirometer. The manufacturers are Messrs. Tieman.

Sphygmograph.—This valuable instrument for recording the variations of arterial action, first devised by Professor Marey, has been simplified in an ingenious manner by Dr. Holden. It consists of a flat box, containing within it watch-work for rotating a small rod, around which a slip of paper is wound. A minute steel rod, furnished with a pencil point, crosses the paper obliquely. At the extremity of this rod, the cone-shaped end of a curved spring, the arch of which rests upon the pulse, is inserted, and in this consists the ingenuity of the apparatus, for, as the pulse spring rises and falls, according to the arterial beat, the cone just described forces the rod which holds the pencil laterally outwards, permitting it to recover its position by the inherent elasticity of the rod. Thus, a continuous tracing takes place upon the paper, and a most delicate record is afforded of the variations in blood impulse. An index, with milled headed screw, regulates the pressure of the pulse-spring, and the whole appliance is readily fixed to the arm by one broad webbing strap.

Staphyloraphic Needle.—In the operation for cleft palate, the most difficult step is placing the suture *in situ*. Dr. Mathis, of Indiana, has proposed the solution of this difficulty by the use of a curved canulated needle, having an arc of 170°, and a radius of $\frac{3}{4}$ of an inch. Through the canula passes a fine steel spring, whose proximal end is fastened by means of a thumb screw to a slide, which moves upon the uncanulated portion of the needle.

The distal end of the spring terminates in a small hook. On using the needle, this hook is protruded after the edge of the fissure has been penetrated, and then armed with a suture silk. The needle is then withdrawn, carrying the suture thread with it, and leaving its ends ready for tying.

Steam Atomizer.—This little instrument is intended for the application of Richardson's spray, and may be described as a metal cylinder having water within it, and the ordinary spray-producing appliance at the upper part. The glass atomizing tubes are held in metal sheaths so as to prevent displacement or fracture. A small shield, like a vaginal speculum in form, is fixed just before the end of the spray-tube and serves to direct its current. A lamp under the cylinder, on being lighted, heats the water, while any chance of explosion is prevented by a safety-valve at the top of the cylinder. Messrs. Green and Leach are its makers.

Dr. Murrall has modified this by adding a gutta percha tube so as to direct the stream to any required surface.

Stethoscope.—Instead of the ordinary Laennec's stethoscope, with its trumpet-like end, and straight stem, Dr. Snelling employs two tubes, carved in such a manner that their aural extremities rest together, being connected by a hinge, and conjoined at their other extremity with a bell-like sounding tube, the edges of which are covered with india-rubber. The tubes are opened, and one end placed in each ear of the operator, who is then enabled to distinguish the slightest murmur. A band of elastic fixed across the centre of the two tubes keep their extremities firmly fixed within the ear during the process of auscultation. It was devised by Mr. Camman, and modified by Dr. Snelling.

Suture Pin Conductor.—Dr. Gordon Buck has devised an instrument for fixing pin sutures, consisting of a needle of the slightness of an ordinary knitting needle, fixed to a handle, and slightly curved. Its extremity is bevelled off to a sharp point, like a hypodermic syringe. Its mode of application is first to close the edges of the wound, then perforate them with the conductor, fix the end of a pin suture in its extremity, and draw it in the required direction, when the end of the pin can be easily detached.

Uterine Forceps.—Dr. Pepper, of Philadelphia, has prepared a pair of forceps for dressing the uterus, in which the blades can be removed, and others of a curved form, for carrying therapeutic agents into the cavity of the uterus, substituted. A sound can also be similarly attached. The whole of the separate pieces slip easily into a bivalve speculum, which thus constitutes a case, and admits of being carried in the coat pocket.

Uterine Speculum.—Dr. Storer has constructed a speculum which combines the double advantage of being also applicable as a Sim's retractor. It is shaped like the ordinary speculum, having a rectangular handle, through the centre of which a screw passes, which secures expansion of the sides of the speculum. This screw forms an axis, around which both blades of the speculum rotate, hence they can be separated and made to assume the office of a retractor, thus combining two instruments in one.

English Inventions.

Accident Case.—Messrs. Arnold have devised for Dr. Angove a travelling-bag, containing instruments, lint, bandages, etc., and all the requirements for such accidents as may arise in a mining district.

Anti-Ligature Forceps.—Mr. Webber has invented a pair of forceps for preventing arterial hæmorrhage, in which the parietes are stamped together by the pinching of its corrugated surface. The effect of this process is to close the artery by the dovetailing together of its walls in a manner similar to the gnawing of animals in their division of the umbilical cord.

Apparatus for Uterine Displacement.—The form of instrument which Dr. Protheroe Smith adopts in obstetric cases is equally applicable, with slight modification, for the mechanical treatment of uterine displacement. In addition to the vertical back rods and pelvic spring he employs two curved wire costal springs, resting anteriorly against the acromion, and so arranged as to hold the thorax erect and somewhat backward. The pelvic springs and pubic plate are likewise so set as to tilt the ilia forwards and downwards, thus tending to restore the uterus by external mechanical agency to its normal position. An increase in the ordinary lumbar curve of the spine follows this arrangement, and produces to the patient that sense of comfort which is frequently obtained by placing the arms a-kimbo. The points of advantage in the instrument are, that it is very light and pliant, yet sufficiently powerful to act vigorously upon the pelvis, in forcing it to assume a natural position, and thus give benefit to its visceral contents.

The same instrument becomes also applicable to the treatment of spinal curvature, by the attachment of lateral plates affixed to the vertebral levers, and resting against the axis of deformity.

This appliance has been arranged for Dr. Protheroe Smith by Mr. Heather Bigg.

Appliance for Experimentally Demonstrating the Increase of Tempera-

ture after Surgical Operations.—Amongst the many valuable contributions to the science of practical medicine made by Dr. B. Richardson, few are more striking than the ingenious mechanical experiment by which he has sought to demonstrate his theory, as to the effects of temperature in relation to surgical operations. In order to render the explanation of his experiment sufficiently clear, it must be borne in mind that he maintains as a thesis that there are certain conditions, simple atmospheric conditions, which are favourable to the success of surgical operations, and others which are unfavourable; and that these, favourable and unfavourable, admit of being recognised by the means now at the command of science. He further adds that it is the increment of animal heat, induced by increased resistance after the removal of a part from the whole, which leads to that most frequent cause of death after operation—surgical fever. It is further assumed that there exists in the animal structure prior to operation a certain amount of mechanical force, or heat, spread over the whole, and due to ordinary bodily combustion; and that the proportion of this force may be comparatively great or less in the region requiring removal. After its excision the force just mentioned becomes in a certain sense limited in its distribution, and there is, therefore, a temporary interference with its development in the body as a whole, which occasions what is known as shock. When, however, this depressing effect of the operation is over, and the body resumes its original condition, then active combustion is restored, and there will be increased resistance in the remaining part of the organism, with consequent increment of temperature.

To illustrate this mechanically, Dr. Richardson mapped out on a piece of flat board the venous and arterial system of man. The arteries were represented by insulated copper wires, and the veins in a similar way. All the arterial wires had their origin from a bundle corresponding with the aorta, and were divided, some for the brain, the others for the extremities. At the termination of each arterial course the wire was coiled to represent capillary surface, and glass tubes, containing mercury, placed within each, as also a small thermometer. These coils terminated in a return wire, representing the venous system, and mingling in one bundle, emerging at the same point as the arterial bundles entered.

The two terminal bundles were connected with a Grove's battery in such a manner as to complete the venous and arterial circuit. Now on charging the battery, all the thermometers placed within the coils already mentioned registered the same degree of temperature. On removing, however, any portion, say, for instance,

an extremity such as the imitation arm, an immediate rise in the thermometer occurs; for although the force of the battery remains the same, the resistance it has to encounter is increased, and a consequent raising of temperature produced.

If instead of mere wires and columns of mercury the animal fluids of the body could be represented, the same effect would be produced, and the increment of temperature induced by operation clearly demonstrated.

As a mechanical instrument for illustrating a great physiological principle, the arrangement just described is ingenious and interesting.

Artery Forceps.—The object of arresting arterial hæmorrhage by mechanical pressure has been attempted in a variety of ways, such as ligature, torsion, and acupressure. Mr. Jeaffreson has, however, proposed another plan, at once novel and ingenious. It is that of surrounding the artery by a thin fillet of lead, compressed and flattened in such a manner as to control the flow of blood by bringing the internal parietes into close contact. The instrument for doing this consists of a double sliding canula, within which is a small arterial tenaculum, and around its extremity the leaden ring. The artery being grasped by the forceps is drawn within the canula and inside the leaden ring. On turning the handle two little clamps are pressed together, and the metal ring flattened. The forceps is then disconnected by pushing the canula forwards and allowing the tenacula to expand, leaving the end of the artery firmly bound by its leaden fillet.

Artificial Respiration Appliances.—Dr. Richardson, finding the double syringe of Read too clumsy for emergent use, has invented a simple appliance, which may be carried in the pocket. It consists of two tubes, joined together at one extremity, and being furnished at the other with two india-rubber bags, the one for exhaustion, or withdrawing the air from the lungs, the other securing its supply from the atmosphere. The appliance, therefore, forms a double bellows, terminating at one common point, and so valved that when both are simultaneously compressed, and allowed to exhaust (the tube being primarily inserted into the nostril), the one fills with common air and the other air from the lungs. During compression the pure air is driven into the lungs, whilst that received from the nostril is forced out into the external air.

Aspirator for Removal of Fluids and Solid Portions of Deep-seated Tumours.—This instrument is the invention of Dr. Protheroe Smith, and consists of three parts: an outside canula, with a cutting edge;

a second canula contained within the former, and forming at its point a trocar, with perforated lateral opening, or fenestrum; and, thirdly, a solid rod flattened near its extremity into a spring, its point forming a small harpoon.

The instrument is used as follows:—The harpoon is drawn back within the canula, and the tumour punctured to the required depth; the harpoon, being then pushed forward, secures a small piece of the tissue, which is cut off by a slight rotation of the canula, and pulled into the tube. If fluid is present, it can be drawn out by a suction syringe and examined.

Dr. Dieulafoy has also devised a similar apparatus, with the difference that he produces the vacuum for withdrawing fluid into the canula before the puncture, instead of after it.

Carbolic Acid Vaporiser.—Messrs. Savory and Moore have improved their vaporiser, described last year, by substituting for the fine-tubed funnel a wick of cotton, which, acting as a syphon by capillary attraction, regulates the supply of the carbolic acid for vaporisation; and by supplying a sort of night-light, instead of a spirit-lamp, for heating the vaporising dish.

Chloroform Inhaler.—The number of ingenious inventions for inhalation of chloroform may be described as legion, for there is hardly an instrument maker of any fame but who has devised some kind of appliance for this purpose. The most recent and decidedly best, is that suggested by Dr. Morel Mackenzie, and which, in order to avoid any especial proper name being assigned to it, he calls the "eclectic." It consists of a prettily-shaped vase, which is partly filled with water, or any medicated fluid. Within the upper surface of this is a cylinder, in shape like a glass tumbler in an inverted position, and forming the lid of the vase. From the upper surface of this vessel a tube, fitted with a mouthpiece, passes. The top of the vase has holes opening to the external air, whilst the lower margin of the tumbler-cylinder is likewise furnished with apertures sunk beneath the fluid. The result of this arrangement is, that on the patient inhaling, the air is compelled to pass through the medicated fluid itself, hence it becomes saturated with the chemical property, and is not the mere steam from a heated fluid surface. It is a very great advance on ordinary inhalers. Messrs. Bullock and Reynolds are its manufacturers.

Distillation Apparatus.—One of the most important of modern discoveries in relation to the application of heat for scientific purposes is that of Mr. J. A. Coffey, who has found that a sort of paraffin oil may be continuously heated in closed tubes to a temperature of 1,100° Fahr., not only without carbonisation or com-

bustion, but absolutely with very little change, and scarcely any pressure whatever.

He has planned an apparatus for utilising this discovery, and in which an ordinary furnace, placed in a distant building if needed, will heat the liquid oil, and allow of its being distributed for various purposes to other portions of the apparatus.

Eustachian Endoscope.—For the minute examination of the Eustachian tube Mr. Reeves has suggested an instrument, consisting of a cylinder, having a short angular extremity, to the upper surface or elbow of which a reflecting mirror is affixed. The eyepiece of the tube is expanded, and contains a magnifying lens, by means of which any part of the surface sufficiently illuminated by the process customary in such examinations can be distinctly seen.

Hæmorrhoid Clamp.—Mr. Sydney Jones has modified the clamp invented by Mr. Henry Smith. The parallel action of the blades is effected by placing the joint-screw at right angles to the blades, which also gives a scooping action, so that the deepest portion of the pile is seized.

Holt's Screw Dilator.—Mr. Smith, at the suggestion of Mr. Paget, has substituted a screw movement for the wedge force originally proposed by Mr. Holt for dilatation of the urethra, and found it much more easy to the patient, and manageable by himself.

Improved Valentin's Knife.—This instrument, as is well known, consists of a knife with two blades, which are kept at parallel distances by means of regulating screws. In the new knife the second screw is dispensed with altogether. The blades are quite separate, and one broad-headed screw passing through both holds them together. They are kept in position by two springs between them, one above and one below the screw. The maker is Mr. Hawksley.

Insufflating Pessary.—One of the principal objections to the employment of an ordinary inflated pessary is that of the tube through which the air is supplied becoming an annoyance to the patient when constantly worn. To remedy this, Mr. Clay of Birmingham has devised a pessary which contains a small tube within its centre. This tube is made to answer the purpose of a piston rod, and after inflation by means of a syringe, it is pushed into the body of the pessary, and thus produces a flush surface. The pessary has two catgut strings for facilitating its removal when required.

Laminaria Dilator.—Mr. Reeves has planned an instrument for the use of laminaria in stricture. It consists of a small catheter,

probe pointed, and with a slight curve, within which the laminaria fits; the advantage being that it can be readily withdrawn without risk of breaking off.

Mechanical Aid to Labour.—Dr. Protheroe Smith, in a series of able papers, has demonstrated the value of mechanical assistance during the act of parturition, and devised an apparatus for carrying his views into effect. It consists of a light pelvic spring, sustaining a padded plate anteriorly, and having posteriorly two vertical rods resting on each side of the lumbar vertebræ. Across the centre of these rods a horizontal spring passes, which gives attachment to an abdominal belt. This belt is formed in three parts, corresponding in force and direction with the muscles composing the abdominal parietes, and being capable of rapid compression at the will of the obstetric physician, and during the labour-pains of his patient. This appliance has been arranged for Dr. Smith by Mr. Heather Bigg.

Obstetric Bag.—Messrs. Arnold have arranged a bag, which is literally a *multum-in-parvo*, as it carries all the necessary instruments for obstetric practice, and also has bottles for containing ammonia, brandy, etc. The whole is conveniently packed, and occupies but small compass. The suggestion is that of Dr. Greenhalgh, and it is likely to prove highly advantageous, in comparison with the midwifery cases hitherto made, on account of its ready portability.

Ovariotomy Clamp.—This instrument, devised by Mr. Spencer Wells, consists of a hinged circular clasp attached to the extremity of a pair of forcep blades, and so planned as to admit of the forceps being readily detached after the clamp is fixed and sufficiently lightened. Mr. Wells considers it much more handy and effectual than the parallel clamps hitherto used, as it more effectually strangles the membrane contained with it.

Pharynx Insufflation.—The intention of this apparatus is that of adopting dry powder instead of gargles, as being more directly brought to bear upon the affected part. The instrument consists of a tube communicating with an india-rubber ball. Into the side of this tube any medicated power can be introduced and the aperture closed by a slide valve. On grasping the india-rubber ball a puff of air is produced throwing out the powder at the extreme end of the tube, and in contact with the region for which it is intended. It is an invention of Mr. Bradley.

Phymosis Dilator.—Dr. Cruise adopts a pair of forceps having blunted extremities, and suddenly opened by the closing of handles resembling those of a pair of scissors, his object being to tear up

the mucous membrane in a line with the axis of the penis, and without injury to the skin.

Respirator to Prevent Metallic Poisoning.—Dr. Mapother has devised an appliance for this purpose shaped like the vertical section of a pear, and embracing both nose and mouth. It is composed of gauze lined with cotton wool and having a small piece of wood grasped between the teeth, and securing attachment of the respirator to the face.

Retentive Catheter.—Mr. Barnard Holt has invented an instrument which can be kept in the bladder for any length of time without injury to itself or the patient. It is composed of vulcanized india-rubber, having on either side a fin of the same material which prevents its escaping from the bladder, and requires no tapes or extraneous bandaging, whilst the patient can urinate at will.

Retentive Catheter.—Mr. Davy has had a catheter made with a piece of string fixed to its end and passed through a small slot two inches above it. By first introducing the catheter in its straight form, and then pulling the string, its end becomes curved and incapable of removal from the bladder until the string is released. It is at once simple and ingenious.

Self-adjusting Pessary.—Mr. Blackbee has suggested a modification of Dr. Prothero Smith's spring pessary in the following manner:—Instead of the two bivalvular wires resting semi-horizontally and receiving the cervix uteri between their upper space, they are made to assume an almost vertical direction. The lower arches find their resting-place on the inferior margin of the foramina ovalia, whilst the upper extremities act as crutches, one before and the other behind the cervix uteri.

Self-illuminating Opthalmoscope.—This instrument is the invention of Dr. Lionel Beale, and consists of two brass tubes sliding within each other. At the extremity of one of these tubes a block of wood shaped to the orbit is inserted, while to the side of the other a lamp is fixed. The inner part of the cylinder carries a reflector and the ordinary opthalmoscope lens. The opthalmoscope can be held in the hand or may be mounted upon a stem, and as the eye is examined in a manner similar to that of looking through a telescope, it can be used in any room in full daylight or when lamps are lighted. This arrangement entirely obviates the necessity of a dark room for opthalmoscopic investigations. It can also be used perfectly irrespective of the patient's position, being equally applicable to the standing or recumbent posture. It has extra lenses so as to be able to form an otoscope, endoscope, or laryngoscope.

Slow Cautery Forceps.—Mr. Clover exhibited before the Clinical Society a pair of forceps which, when heated to a brown heat in a gas flame, arrested hæmorrhage very completely.

Sphygmograph.—The most recent improvement in this valuable instrument is that of dispensing with the pad upon which the hand was generally placed, and substituting for it two wadded arms, holding either side of the wrist, and permitting the spring to rest gently on the region of the pulse. A delicate screw regulates the pressure of this spring, and permits of the most minute variations being chronicled. Dr. Broadbent has also devised an improved sphygmograph, for application to the arm in a semi-prone position, thus obviating the necessity for forced extension, and consequent interference with the pulse from muscular tension.

New Spinal Support.—Instead of employing the usual metallic pads fixed by steel rods to the pelvic band of a spinal apparatus, Mr. Heather Bigg adopts the force of a soft webbing band in which elastic is inserted, so arranged as to cross over the arcs of both lumbar and dorsal curves in opposite directions, finally fastening by a few lacing holes to a small spring placed in the front of the appliance. The advantage of this arrangement is that the patient has the deformed surfaces gently though firmly acted against by elastic pressure, thus enabling the spinal support to be of the lightest weight, and quite concealed beneath the dress. The vertebral muscles are also allowed free exercise, whilst the growth of the patient is assisted by the extension brought to bear on the spinal column.

Splint for Aneurism of the Lower Limb.—Mr. G. C. Coles exhibited in January, at the Medical Society, an instrument devised for treating aneurism by elastic pressure. This consisted of an ordinary Liston's splint, having a sliding-piece attached to the margin, which carried a screw torniquet with elastic bands. The merit of the invention lies in the steady position given to the aneurismal compress.

Splint for Continuous Extension.—In the Edinburgh Infirmary a very simple plan for carrying out continuous extension, in cases of hip disease or fracture, is adopted, and may be thus described. A foot piece of wood, something like the sole of a shoe, has fixed to its heel a strong cord, carrying a weight. Two broad strips of plaister, extending from the centre of the thigh to the under surface of the heel part, are heated, and serve to fix the shoe-piece and its weight to the limb. For further security, and to keep the limb in position, a starch bandage is applied over the plaister. The foot-piece being thus firmly secured to the limb, the cord to

which its weight is attached is passed over a pulley, raised from six to twelve inches above the level of the patient. The end of the bed is also tilted up about eight inches, to prevent the weight dragging the patient downwards. This latter arrangement might, however, be better accomplished by fixing the pelvis through the medium of a broad but soft perinæal band, secured to the head of the bed. The whole plan is very simple, and its results are described as highly favourable.

Splint for Excision of Knee-joint.—Mr. Knaggs, of Huddersfield, has prepared a mechanical appliance for treating these cases, consisting of two padded metal bands, one surrounding the thigh, the other the calf of the patient. These rings are held apart by four metal rods, moulded to the shape of the leg, and thus holding in a state of rest the articular surfaces at the point of excision. Mr. Knaggs is probably unaware that the same form of apparatus has been for some time adopted by Mr. Paget for a similar purpose, namely, that of holding the knee-joint steady after removal of loose cartilage, disease of articular surfaces, etc. In Mr. Paget's splint, the rod which passes at the back of the limb is left sufficiently broad to receive and support the weight of the limb, a highly important condition in these cases.

Splint for Fracture of Femur.—Mr. Paget advocates the American plan of swinging the limb in a trough splint, the cords of which draw the limb upwards and forwards, whilst extension between the pelvis and the thigh is maintained by their tension. The whole limb is sustained, and the knee a little bent.

Splint for Hip Disease.—To the lower edge of an ordinary leathern splint a long wire rod is affixed, bent at right angles beneath the foot, and holding a strong elastic cord fixed to a padded ankle-band. A perinæal strap is also fastened to the margin of the splint, so as to secure counter-extension when the elastic ankle-cord is brought into use. To prevent abduction of the foot, a cross piece of steel is riveted on to the ankle-wire at its posterior margin. The whole forms a manageable and simple appliance for the treatment of morbus coxarius.

Splint for Oblique Fracture of Tibia.—Mr. R. S. Lenning employs for this purpose a flat piece of wood, of the length and breadth of the entire limb. To the inferior margin of this, an angular piece of metal wire, containing an extending screw, is fixed, whilst the lower end of the tibia is sustained by a padded plate fixed to the inferior margin of the splint. Over the seat of fracture a small metal arm is placed, having a screw and pad, for making direct but easily regulated pressure on the seat of fracture. Extension and compression are the principles involved.

Support for Infantile Paralysis.—In no class of cases where mechanical support is needed can greater necessity exist for extreme lightness than where the muscles of the lower extremity are weakened by infantile paralysis. The usual instrument for these cases is a straight rod, having joints which correspond with the knee and ankle articulation. Mr. Heather Bigg has devised a substitute for this arrangement, in which a light and pliant metallic spring is made to sustain the limb instead of a stiff rod, whilst, in addition, the knee and ankle joints are furnished with elastic cords, playing the part of the weakened muscles, and thus aiding the patient in walking, etc. The object of the mechanism is to combine freedom of the limb with the minimum of mechanical support, thus helping any chance which may exist of renewed strength. The growth and development of the limb are also encouraged by the exercise which this instrument enables the patient to take.

Tonsil Guillotine.—Mr. Ewens has devised an instrument which is furnished with a wire-gag, preventing closure of the mouth during the adjustment of the ring around the tonsil, its transfixion and amputation.

Trocar for Paracentesis Thoracis.—Dr. D. Powell has had adjusted to a double-branched trocar, joined together by elastic tubing so as to form a syphon, a mercurial pressure gauge, in order to ascertain the fluid pressure within the chest, and to inform the operator as to the degree of negative pressure obtained at different stages of the operation, and its effects upon the respiratory movements.

Truss for Severe or Old-standing Hernia.—The difficulty of sustaining a large scrotal hernia by mere force is well known, on account of the excoriation so frequently induced by any attempt to employ direct power against the inguinal orifice. That, however, which cannot be accomplished by sheer force is obtainable from the use of a skilful combination of adaptive screws. A truss has been devised by Mr. Heather Bigg, in which the direction of the supporting power is governed by two ratchet axes. One produces a vertical rotation of the pad, so that its inferior margin gains an uplifting direction; the other secures a horizontal movement, and this prevents the hernia from escaping at the antero-lateral margin of the inguinal ring.

Urethral Injector.—Instead of the ordinary syringe for this purpose, Mr. Morgan has contrived a glass bottle, furnished with two tubes. One has a sharp point, entering the urethral orifice; the other is intended to be placed in the mouth, so that by blowing

down it, a continuous stream of the fluid contained in the bottle may be made to pass into the urethra. It is more reliable than the syringe principle.

Vaginal Specula.—Physical examination in the investigation of disease is one of the principal aims in medical enquiry, and probably nothing has assisted more in securing the correct diagnosis and treatment of uterine diseases than the use of the speculum. The objects of an ordinary speculum are threefold:—first, to expose as much of the region as may require to be examined; secondly, to be introduced easily; and thirdly, to admit of the parts to be investigated being readily illuminated. The general form of a vaginal speculum is bivalvular, but Dr. Meadows has recently devised a considerable improvement. He employs three or four narrow blades, capable of great extension, and is thus able to make digital examination simultaneously with the specular. The only disadvantages attached to this arrangement are the loss of reflecting surface, and the risk of grasping the surface of the vagina between the folds of the instrument in closing it. This is, however, easily prevented by a little delicate manipulation, and the instrument may be described as perfect of its kind; whilst its reflective power, gained from the four narrow surfaces, is equal to the area of an ordinary speculum reflector.

Mr. Spencer Wells has recently devised a very clever form of self-retaining speculum for operations on vaginal fistula. He fixes the instrument to the sacrum, so that no movement of the patient can displace it, whilst the blades are those of Dr. Marion Sims' well-known instrument.

Vessels for Liquid Nitrous Oxide Gas.—The importance of nitrous oxide gas as an anæsthetic for minor operations has so long been acknowledged as to render any statement of its advantages superfluous. One difficulty however attached itself to the administration of this admirable agent, namely, the bulk it occupied in its gaseous form. Any one who has witnessed the exhibition of nitrous oxide gas must remember the huge and somewhat unsightly apparatus required. To obviate this difficulty nitrous oxide gas in a liquid state has been prepared, but as its explosive power is 750 lbs. to the square inch, it required a proper and strong vessel for its reception. This desideratum has been achieved by Messrs. Coxeter, who invented for Mr. C. J. Fox several wrought iron-vessels of a cylindrical form, and furnished with a stop-cock, to which is attached an India rubber ball for breaking the escaping force, and a Clover's nose piece, so that the gas may be exhaled through one valve and inhaled by another. The largest vessel contains 100

gallons of liquid gas, although it is but 12 inches long and 3½ inches in diameter. Its weight is 9 lb. 1 oz.

Water-pipe for Preventing Lead Poisoning.—Messrs. Walker and Campbell have devised means for encasing an ordinary water-pipe with block tin, so that water used for drinking purposes may be free from metallic impurities.

French Inventions.

Angular Bladed Stone Forceps.—M. Amussat has devised a pair of forceps in which, by the movement of a rack and pincer, the blades become rectangular within the bladder, and thus are enabled to grasp a stone within the fundus.

Binocular Ophthalmoscope.—This instrument is the invention of Dr. Wecker, of Paris, and affords two distinct images of the organ under examination; hence admitting of demonstration on the part of the surgeon who examines to any one who is looking on—a point of immense importance either for purposes of instruction or consultation. The optical apparatus consists of a plano-convex object glass, behind which are fixed two rectangular prisms, the whole being enclosed in a brass box, with a handle beneath, and openings on three sides. It is used with a mirror in the ordinary way.

Bougie Olivaire.—The ball bougie, although considerably modified in France, is said to have been the invention of Sir C. Bell, who constructed one of silver, and called it a ball staff. Leroy d'Etoilles modified this, by making the stem of gum elastic. Dr. Dick suggested another change of form, having the head made like a pastile. The kind now in general use, and called the bougie olivaire, was invented by Liout, and consists of an olive-shaped head, fixed to a pliant gum elastic stem. It forms the most delicate test for urethral stricture ever introduced.

Continuous Current Apparatus.—M. Ruhmkorff has devised a portable current pile for the use of M. Duchenne, which consists of forty-two elements, contained in a square box, having six ranges, each divided into seven compartments.

Charcoal and zinc immersed in a weak solution of bisulphate of mercury are employed for producing the electric action. The solution is contained in glass vases, resting on the base of the box, whilst the charcoal and zinc elements are attached to a movable frame, which by means of a ratchet action raises or immerses them at will. Hence the intensity of the current can be always regulated, and the loss by waste reduced to a minimum.

Intestinal Sutures.—Dr. Berenger-Feraud has suggested the following simple method for closing wounds of the intestine. Into two pieces of cork, cut in the form of a thin prism, four or five pins are thrust, having their points outwards; the cork containing the heads is then painted with sealing-wax. Each cork so provided is placed within the intestinal canal, at the region of fissure, and the pins forced through in such a manner that those in the upper cork interserrate with those of the lower, clamping between them the edges of the wounded intestine, and that so closely that no foreign body can pass. In process of time the line of tissue so clasped detaches itself, the corks containing the pins fall into the intestinal canal, and are carried out with the fæcal matter.

Lithotrity Forceps.—Dr. Béclard describes a pair of forceps so devised that by turning a ratchet after the blades are inserted in the ordinary manner, two little lips at their extremity bend down at right angles to the blades, and grasp the stone. The movable lips are then brought into the straight position, carrying the calculus with them, and the extraction is at once completed. The object of the forceps is to securely grasp and remove a calculus through a small perinæal aperture.

Muscular Power Gauge.—M. Mathieu has constructed a delicate instrument for measuring the power of the muscles of the arm in cases of semi-paralysis, etc. It consists of an elliptical steel spring, within which is a brass semicircle with a scale. The sides of the ellipse are kept extended by a ratchet-standard having a hand which chronicles on the brass segment any depression which the transverse axis of the ellipse undergoes. To bring it into use, the patient presses with his arm the sides of the ellipse; they in their compression force the hand round the segment. The cog work of the ratchet-standard prevents the hand from coming back again, and thus registers the muscular power employed.

Œsophagus Bistoury.—M. Trelat has planned a very ingenious instrument for dividing cicatricial contractions of the œsophagus. It consists of a tube, having at its end a flat protuberance, shaped like a heart, and containing just the two blades, capable of being opened in a fan-like form, on a screw attached to the handle of the instrument being turned. The distance from this prominence to the end of the instrument, and also the exact spread of the blades, are readily ascertained by looking at a graduated scale placed at the outer end of the instrument. The object of the bulb-like prominence is twofold, first, to discover the precise position of the structure, and then to give force and direction to the expanding blades.

The instrument is introduced with the blades hidden; the bulb is passed behind the point of stricture; the blades opened and fixed, and the instrument withdrawn, cutting the stricture open in its exit, whilst the blades are promptly closed so soon as the stricture is felt to be divided.

The Otoscope.—This is an instrument intended to determine the mobility of the tympanum. It consists of a brass cylinder, to one end of which is affixed an aural cone or speculum, whilst the sides have two india-rubber tubes attached, furnished with valves. The other end of the cylinder is closed by a glass disc. On using a reflecting mirror the tympanum can be easily seen, and on the air being either compressed or rarified, the changes on the surface of this membrane can be carefully noted. It is made by M. Galante.

Portable Vapour Bath.—Dr. Lefebre has planned a very simple method of administering vapour to any part of a patient's person. His apparatus consists of a small closed vessel, in which water is poured, and under which is a spirit lamp. At the upper surface of this vessel is fixed a flexible tube, carrying at its end a perforated nozzle. On the lamp being lighted steam is generated, and this can be directed by means of the tube to any surface requiring its application. It is very similar in principle to Surgeon-Major Wyatt's bath, so long known in England.

Porte-caustic.—Mr. Jacquart employs a tube of platina or silver, at the sides of which are three long oval apertures, allowing the caustic to come in contact with the tissues laterally as well as anteriorly, and lessening the risk of breaking off.

New Rhinoscope.—Dr. Duplay's instrument is made like a pair of curved scissors, having a mirror at one end over which a small ring passes. On depressing the handles, the ring becomes separated from the mirror, thus raising the soft palate and permitting a good amount of light to reach the nasal fossæ, and openings of the Eustachian tube. As it can be used in one hand, it leaves the other free to perform any necessary operation, such as ablation of polypus.

Spray-Producer.—Professor Béclard presented to the Academy of Medicine a new instrument for producing spray. It consists of a bowl in which an elastic ball is confined, and over it a cap. There is also a pump supplied with a valve, on moving the piston of which five or six times the ball becomes compressed, causing any water poured into the bowl to be forced towards the exit-valve. On this being opened, a continuous spray is produced lasting three minutes, and thus doing away with the hardworking of a Richardson's spray-producer.

Subcutaneous Aspirator.—Dr. Dieulafoy introduced an instrument to the Academy of Sciences under this title which differs but slightly from that invented in England by Dr. Prothero Smith. Both instruments have an identical object, viz., the abstraction of the contents of deep-seated cysts or tumours without the accidental admission of air. The difference between the instruments is, that Dr. Dieulafoy creates a vacuum first, before the exploring needle has reached the contents of the tumour, and Dr. Smith produces it afterwards by the usual suction and the piston plug.

Urethral Dilator.—M. Broca presented to the Academy of Medicine of Paris a report upon the dilator of M. Corradi, which dilates the urethra without tearing its mucous membrane. The instrument consists of two slender silver rods joined at their vesical extremity. By means of a screw in the handle, one of these rods can be shortened, thus bending the other like an arc upon its chord. The instrument being introduced beyond the stricture the rod is shortened, and the whole slowly withdrawn, producing a dilatation in the transverse direction which is not at all painful, and causes no hæmorrhage.

Urethral Retrograde Dilator.—Messrs. Robert and Colin have constructed a dilator formed of a steel cylinder splint with several parts, and containing within it a small metal bulb which, upon being screwed within the cylinder, causes an expansion in shape like an inverted cone of the steel cylinder. The force is therefore applied from behind forwards, hence its name. When the stricture is sufficiently dilated, a turn of the screw closes the spread sides of the cylinder and permits of ready removal.

Uterine Injector.—Dr. Germain has had an instrument constructed by M. Matthieu for the purpose of injections into the uterus. It is composed of a cylinder containing three distinct tubes. One extremity of the cylinder is open, and ends in the usual curve of the uterine sound; to the other extremity three india-rubber balls are attached, communicating separately with the internal tubes of the cylinder. By dipping the end of the cylinder into water and exhausting by compression the air from one of the balls, water immediately enter it. The other two can be similarly filled, one with a solution of nitrate of silver and the other of table salt. Supposing the uterine tube fairly introduced into its intended cavity, pressure on the water ball causes a stream to flow which cleans and washes out the parietes. Then the solution of lunar caustic can be made to enter in a similar manner, and after a little while the brine is introduced from the third ball, to neutralise any excess of the nitrate of silver.

Wounded Intestine Clips.—Dr. Péan, knowing the difficulty of binding together with ordinary clamps, or sutures the peritoneal surfaces of wounded intestine, has devised an instrument by which a series of clips hold the sides of the wound firmly together, and which admit of ready removal after the surfaces have agglutinated. His instrument consists of two distinct parts. One is a stem, having two little rectangular points, capable of being moved towards each other on the pressure of a small piece of wire, placed like a piston-rod within the stem; the other is a fine wire clip, of figure of 8 shape, so delicately formed that a small ring placed around its centre caused, on its being pushed backward, the edges of the clip to come into contact. There is also an eye at its end, calculated to receive one of the rectangular points of the stem first described.

The mode of action is as follows:—The edges of the intestine are seized by forceps, and their serous surfaces brought in contact by turning the margins of the wound inwards. One of the clips is then held against this surface by means of the stem with rectangular points. On pressing the wire handle downwards, the ring around the clip is driven backward, its points at once close, and firmly grasp together the sides of the wound. A series of clips, proportioned in number to the size of the wound, are adopted, and by the means already described, easily fixed in such a manner as to ensure closure of the intestinal lesion, and maintenance of continuity without any serious inconvenience to the patient.

German Inventions.

Anæsthesia in the operation for Removal of the Upper Jaw.—A medical student of Griefswald has devised a plan for producing anæsthesia during the operation. Tracheotomy is first performed, and a canula with a caoutchouc apparatus introduced into the trachea. This apparatus consists of a small bag, which, upon being inflated, completely fills the trachea and shuts out the air from the rima glottidis. Chloroform is then inhaled through the canula, and no blood during the operation can enter the lungs.

Apparatus for Applying Cold to the Vagina.—The usual method of applying a low temperature to the vagina, is that of a douche of cold water; but where the operation has to be performed several times during the day, this offers objection on the score of wetting the clothes, etc. Dr. Krisch, of Prague, has invented an appliance for this purpose, which consists of a female speculum, over the mouth of which a metal plate is soldered, and which plate is per-

forated for the insertion of two tubes. One rests in a vessel suspended at a slight height above the patient, and the other is allowed to rest in an empty basin. The two tubes form a supply and waste apparatus, having the speculum for their centre. The speculum is first inserted *in situ*, and then air withdrawn from the end of the waste pipe by sucking it for a few seconds; this induces a flow of water from the receptacle in which the upper pipe is placed, and a continuous stream of cold water passes through the speculum and escapes by the waste pipe. No fluid, therefore, ever comes into contact with the vaginal surface, but only the cold sides of the speculum, the temperature of which can be maintained for any length of time, being regulated by that which is contained within the supply vessel.

Bladder Irrigator.—Dr. Stocker, of Wildemgen, has proposed an apparatus which consists of a glass or tin vessel, containing the fluid to be injected, and to which is fixed a tube carefully attached to the end of the catheter. By turning a valve, the fluid, which is held high above the patient, descends and enters the bladder. The vessel containing the fluid is hung at a determined height, so as to determine the force of the injected current.

Club-foot Apparatus.—Professor Lucke has planned an instrument for the treatment of equino-varus, which combines the splint of Stromeyer with the more modern plan of india-rubber cords. A padded metal trough, extending above the knee, has attached to it, by a double joint immediately above the knee, a metal shoe-piece, to the sides of which rectangular steel rods are fixed, these being furnished at their extremities with studs. On applying india-rubber straps between the studs of the shoe-piece and the sides of the calf-trough, the foot of the patient gains extension of the heel and abduction of the foot. It is a very ingenious and powerful instrument, accomplishing its purpose in less time than any other, and preserving during the period of treatment the free use of the tarsal articulation.

Ear Douche.—For cleansing the ear, this appliance is very efficient. It consists of two tubes joined together at their anterior extremity so as to be able to enter the orifice of the ear. To each tube an india-rubber pipe is fixed, one of which rests in water, whilst the other serves as a waste-pipe for the water which has already entered the ear. An india-rubber ball pump can be used to force the water through the first tube.

Ear Mirror.—In order to dispense with the aid of an assistant in operations upon the ear, Dr. Lucae has contrived a little appliance, consisting of a spring, which fits the shoulders and holds a small

standard capable of being regulated as to height and direction by milled headed screws, and terminated by a small perforated mirror.

Esmarch's Irrigator.—This is a douche in general use in Vienna, and is designed for washing wounds where a powerful stream of water is required. It consists of a tin cylinder, from the side of which issues an india-rubber pipe, furnished with a perforated nozzle. Its simplicity is remarkable.

Improved Laryngoscope.—M. Walderbey has had a laryngoscope made like a pair of spectacles, having two concave mirrors, with perforations for the centre of the eye, and being attached to the head by springs passing over the ears. Each mirror can be set to a definite angle, and, after a little practice, the surgeon who uses this instrument will find it both simple and certain.

Mica Spectacles.—Dr. Herman Cohen, of Breslau, has suggested the employment of thin sheets of mica for those who are accustomed to work at furnaces, or over deleterious gases. From the low conducting heat-power of mica it becomes especially valuable to those who have to pursue their callings in the presence of great heat. It is also valuable to chimney-sweeps, fire-men, etc.

Ovariotomy Trocar.—This consists of a trocar covered by a cylinder, through the sides of which four spikes of steel are made to project and fix themselves in the walls of the cyst, for the purpose of facilitating its withdrawal. They act somewhat like the sting of an insect, and thus secure a firm hold on the cystic parietes. The act of turning a small button placed at the end of the trocar causes these spikes either to protrude or be withdrawn into the metal sheath already mentioned. It is made by Eischbaum, of Bonn.

Paralytic Calcaneus Apparatus.—Dr. Volkmann, of Halle, suggests that the paralysed muscles of the calf should be supplied by an india-rubber tractor, fastened below to a stud projecting from the heel, and above to a metal trough surrounding the calf, and fixed by a steel splint to the outer heel of the boot. As limbs atrophy from disease, it is essential to employ, as far as possible, those muscles which are uninfluenced by the paralysis, hence the proposal of an india-rubber cord, which has, however, long been adopted in England by Mr. Heather Bigg.

Probe for Thoracentesis.—To avoid the danger engendered by the imperfect flowing of matter from the pleuritic cavity after the operation of thoracentesis has been performed, Professor Kussmaul, of Freiburg, has devised a probe which has three holes on each side of that portion which enters the cavity, and terminates outside in two sharp diverging shanks, to which india-rubber tubes can be fastened for facilitating the withdrawal of fluid.

New Rhinoscope.—The merit of this instrument, which has been devised by Dr. Frankel, of Berlin, is that of permitting the mirror to travel in a vertical direction, corresponding with the position of its handle; hence no displacement is very likely to occur after the apparatus is once placed *in sitû*.

New Stethoscope.—Mr. Ounche, of Berlin, has devised a stethoscope which, instead of having the ordinary truncated and flattened extremity, is formed like a ball. The wood is also solid, instead of being bored according to the plan of Laennec. The advantage claimed is that of being able to examine the most minute surface.

Stomach Pump.—All who have had occasion to use the stomach pump of Kussmaul, or any similar apparatus, must have experienced the inconvenience occasioned both to doctor and patient by its syringe-like arrangement. This can be remedied by using a lever or raiser for emptying the contents of the stomach instead of a pump. Ploss, of Leipsic, was the first to employ this principle. Dr. Rosenthal, of Berlin, has proposed a modification. His appliance consists of a tin reservoir, hung at a convenient height on the wall of the room. This is filled with water, and has a tap-cock at its bottom, to which a tube of india-rubber is attached.

Test Types for ascertaining Acuity of Vision.—Dr. Burchardt, instead of using letters of various sizes as a test for vision, employs a series of dots, situated at different distances from each other, and arranged in groups, graduated carefully and with mathematical precision, so as to gauge distant or near vision. As no letters are employed, these tables of test-types can be used by persons who cannot read, and belonging to any nation.

Tongue Spatula.—Dr. Frankel, of Berlin, has arranged a spatula, shaped like a heart, and having at its anterior extremity a small cleft for seizing the uvula if required. The handle is set on a level with the blade, so that no light is lost in introducing the instrument into the mouth.

Tracheal Tube for Loss of Voice.—This little apparatus is the invention of Professor Czernay, and is made by Leiter, of Berlin. It consists of a canula, having a sounding or voice plate at its upper extremity, and a small rectangular tube, governed by a ball-valve to prevent exit of air, except through the sounding-plate. After injury or extirpation of the pomum Adami, this instrument is extremely useful in restoring the power of speech.

Transfusion Needle Syringe.—This instrument of Dr. Bresgen consists of a cylinder having a rectangular tube at its lower surface, furnished with a screw attached so that either a valve for supplying fluids or one for abstracting them can be adjusted at will. The

end of the syringe is furnished with a puncture-needle. Should emptying a cyst be the object, it is only necessary to fix the exit-valve to the rectangular tube, when the pus received into the syringe is driven out through it. Should, however, injection or transfusion be needed, then the inlet-valve is screwed on instead, and the nozzle of the tube brought into contact with the fluid to be injected.

Truss for Inguinal Hernia.—Dr. Ravoth, of Berlin, believes that he has solved the problem of supporting a hernia with the minimum of force, by employing a spiral spring within the part, similar to that of Cole's, only sufficiently free to be acted upon by the spring of the truss.

New Urethrotome.—Dr. Stocker, of Hamburg, has improved upon the instrument of Ivanchichs, by causing the knife to pass through a slit in the under surface of the catheter by means of a screw with notched teeth, instead of a spiral spring. The advantage of this arrangement is that of certainty in gaining the cutting power, owing to the projected knife being so firmly held. The screw also readily brings the knife within its canula or sheath after the operation is performed, and thus aids the withdrawal of the whole.

Portuguese Inventions.

Nævus Compressor.—Dr. Brandt, of Oporto, having had a case in which a large congenital erectile tumour occupied the inner side of one cheek, existing to such an extent as to protrude through the mouth, has devised an instrument for its compression in order that perchloride of iron might be injected. The apparatus consists of a double-bladed forceps, between which the cheek is so fixed as to admit of the flat solid blade resting against the outer cheek, whilst a ring aperture made in the inner blade circumvents the tumour, and admits of such pressure being made as shall insure its isolation when the tincture is injected. A few turns of a screw fixed within the forceps handle effects this compression, and on coagulation becoming complete, which takes place in five or six minutes, the forceps are gradually unscrewed and gently withdrawn. The use of this instrument eight times on different occasions enabled the tumour to become solid, its contents extracted, and a perfectly smooth cheek obtained.

SHETLAND ISLES.*

Report by HENRY L. SAXBY, M.D., *etc.* (*of Baltasound*).

As a rule, the following remarks, more especially those relating to food, clothing, and dwelling, apply more strictly to the northern portion of this group of islands, than to "Mainland," which contains Lerwick, the capital, and in fact the only town, the habits of the population of these districts being considerably modified by frequent and easy communication with other parts of Scotland.

Climate, etc.—The climate, though damp, is far less severe than is generally supposed, the mean annual temperature being 2·63 above Orkney, and only 1·08 below Glasgow. Heavy falls of snow are frequent, even in May and October, but neither frost nor snow are of long continuance, owing, no doubt, to the fact that, no spot in the whole of Shetland is more than two miles distant from the sea. The surface of the ground, though very irregular, is so retentive of moisture that for nine months in the year it is in a state of constant saturation; this, added to the evaporation from the sea, gives rise to a condition of atmosphere sufficiently depressing to the natives themselves, and exceedingly trying to visitors, very few of whom are able to remain here long without impairment of health. At mid-winter the sun remains above the horizon only four hours, and it is at that time of confinement within doors, of want of bodily exercise, and of excessive indulgence in unwholesome food, that hepatic diseases prevail among both old and young. Among the numerous cases of jaundice now (November 21st) under my care, there are three in one house. Rheumatism and pulmonary affections are most common in spring, during the long periods of bright sunshine and cutting N.E. wind which invariably occur at that season. The prevailing wind throughout the whole year is S.W., the dampness of the climate, however, can scarcely be considered so great a cause of disease as the sudden changes of temperature. Only last June, the thermometer was at 81° (Fahr.) in the shade—two days afterwards it was 48°.

The natives of Shetland still bear traces of their Scandinavian origin in their fair complexion and somewhat tall stature, as well

* This Report only arrived on December 30th, when the rest of this Volume of Reports was in print.—[ED.].

as in their strength and activity. Bodily deformity is of very rare occurrence. As far as can be ascertained at present, puberty occurs at an early age in females, but late in males. In the latter the average is about sixteen, in the former twelve years of age; but the commencement of menstruation not unfrequently takes place at the age of ten or eleven. In explanation of this, it should be observed that boys are both ill-fed and ill-clothed, and are sent out to work when very young; while girls, who become skilful knitters almost in their infancy, and earn good wages, are enabled to afford themselves many luxuries: the girls also sleep in the warmest and most crowded rooms, and in fact encourage by every means a rapid arrival at maturity and an extraordinary tendency to every form of hysteria. The women, however, begin to decline early in life, while in men the opposite is the case. Both sexes are upon the whole long lived; and comparatively speaking, it is very rarely that a child dies while at the breast. Among the upper classes an extraordinary degree of longevity is not unfrequently attained, and the same would doubtless be the case in the lower classes, but for the inhuman practice of systematically neglecting the aged sick, who are too often left shut up in their miserable, dark "box beds" without food or medicine, which are deemed useless to those whose "time is come."

Twin births are of frequent occurrence. In one year I observed that the average was as high as 1 in 20.

Dwellings.—Although some degree of improvement is gradually taking place in the dwellings of the poor, yet it is probable that there has been but little advance during the last century, or even longer. The cottages are roughly built of stone and clay—in some few instances of turf, and are almost invariably thatched with straw, beneath which a layer of turf is usually placed. Each cottage is divided into two apartments; the smaller, measuring about eight feet square, being used as a bed room; the larger, not only as a bed room, but serving for all domestic purposes, as well as for a shelter for pigs, sheep, calves, poultry, and even sickly foals. The filth which thus accumulates exceeds all power of description. An instance lately occurred to my notice in which the "floor" had gradually risen to four feet above its original level, and in removing which, the skeleton of a sheep which had died there three years previously was discovered. The peat fire, raised from the ground by means of flat stones, is placed either against the wall, or in the middle of the apartment, the smoke being supposed to find exit through a hole in the roof. The windows are small, and seldom made to open. "Box beds" 6 feet long by 4 feet wide, are almost

invariably used, and of course prove a most prolific source of disease. The inner room is nearly always overcrowded, sometimes indeed, being occupied by as many as eight or ten individuals, among whom there are sometimes two married couples. The cow-house is always close to the dwelling-house, occasionally under the same roof, and although used by the family for all convenient purposes, is only cleaned out once a year. Drainage is very seldom attended to, a hollow in the ground in front of the door being considered sufficient for the reception of all refuse, solid and fluid. Under these circumstances it may appear surprising that epidemics are comparatively unfrequent, but the immunity is perhaps mainly attributable to the scattered population and the free ventilation consequent upon faulty building. The inhabitants entertain the idea that those cottages are the healthiest which are constantly filled with peat smoke, and indeed, experience forbids a rash denial of the theory.

Food and Clothing.—Defective diet and improper clothing, together with hysteria, which indeed is too often the consequence of one or both, appear to be the main causes of disease in Shetland. Diet varies considerably, according to the weather and the season of the year. In summer, fish, oatmeal, and potatoes form the staple diet, and for the remaining nine months, the meal and potatoes are only eked out with occasional fresh sillacks,* or small codling. Cabbage is used in early winter, but other garden vegetables are almost unknown, and, where known, disliked. Salt meat, and even salt fish, with the exception of skate and sillacks, are looked upon as luxuries. Butter milk whey is the usual summer beverage, and milk, when used, is always preferred in a sour state. Fresh meat is rarely seen among the cottagers, and both fish and flesh are most relished when somewhat tainted, or even putrid. In stormy winter weather when no fish are to be had, and potatoes (seldom good) are becoming scarce, many families live for weeks at a time upon strong tea without milk or sugar, and oatmeal mixed with water, baked in thick, heavy, cakes. At these times diseases of the digestive organs necessarily prevail. Poultry, butter, and even eggs are all disposed of at the shops for the gratification of the inordinate passion for tea, although none is obtainable but that of the worst possible description. It has been truly remarked that tea-drinking in Shetland is as ruinous a vice as dram-drinking elsewhere. Children sit crying round the hearth for want of their morning meal, while the parents, perhaps joining in their tears, partake of strong tea—that acquired necessary of

* The young of the coalfish (Gadus carbonarius).

life for which they have expended their last few pence, or exchanged that which would have kept the whole family in comfort for a couple of days at least. Few of the peasantry would know malt liquor if they were to see it; but although drunkenness is by no means common, all are fond of spirits, no matter how great may be the adulteration with sea water and sulphuric acid. Food is generally taken in large quantities, a habit no doubt acquired in childhood, when after a period of privation, a plentiful supply is occasionally obtained. I know an individual who at one sitting devoured the porridge and milk prepared for six farm servants; and another who upon one occasion ate twenty-three herrings of ordinary size, and two pounds of oatmeal cake. Such instances are unhappily far from rare. An Unst fisherman desires nothing better in the way of food than a large bowl of oatmeal porridge with a lump of strong salt butter or tallow placed in the midst. Could the prejudices of the Shetlanders be overcome, their diet might be greatly improved, but at present they cannot be prevailed upon to cultivate garden vegetables, neither can they, even in times of famine, be persuaded to make use of the mollusca and crustacea which lie in abundance at their very doors. Mushrooms are regarded with abhorrence, and only very few species of the numerous waterfowl are esteemed suitable for food.

With regard to clothing, the most obvious suggestion to the male population would be a less rigid adherence to the custom of exchanging their useful woollen outer garments for the orthodox threadbare suit of black, on Sundays and holidays. Females, however, still continue to pay the penalty of a passion for light and tawdry finery. Fashionable bonnets, and cheap ready-made boots, and, worse than all, goloshes have lately given rise to a most serious amount of disease. As to personal cleanliness, there is room for great improvement. Some of the young people, it is true, choose a warm day in summer for the annual "wash" in the sea, but at other times water is rarely applied to more than the face and hands, and that but once or twice a week. In winter the underclothing often remains upon the body without removal for weeks, and, incredible though it may appear, a flannel shirt put on new is sometimes allowed literally to wear to rags upon the back. No wonder, then, that skin diseases prevail to such an enormous extent.

Blood-letting is still very popular among the Shetlanders. I have no doubt that in the island of Unst, where the practice is most in vogue, as many as four-fifths of the sick are bled by quacks before applying to the regular practitioner. Several very recent cases

could be pointed out in which the patient has literally been "bled to death." One was a case of scurvy; another that of a poor woman who was in a state of syncope from recent flooding after delivery. Under the circumstances above mentioned, the practitioner in Shetland has ample opportunities of comparing the "blood-letting" with the opposite mode of treatment, especially in pneumonia and pleurisy, which are very prevalent at certain seasons. The systematic records of such cases, kept by myself during the last twelve years, are too lengthy for insertion in these pages, but are nevertheless most heartily at the service of any medical gentleman who may feel interested in the matter. In the meantime I need only state that although I have more than once seen a life saved by means of copious bloodletting, and although in most instances the effect is instant relief to the patient, recovery is always tedious and altogether unsatisfactory.

Cupping is invariably performed by women. The operation itself is termed "taking horn blood," and consists of nothing more than "saxing," *i.e.*, scarifying the part with a razor, and sucking the blood through a horn.

Use of Purgatives.—The practitioner seldom errs in administering purgatives in more than ordinary doses, the natives of these islands being, with few exceptions, peculiarly insusceptible to their action. One ounce of sulphate of magnesia is the common dose, and I have seen four ounces taken without any unusual effect. By way of curiosity, I may mention the case of a patient of mine in whom *seven minims* of croton oil caused but a moderate movement of the bowels. This apparent torpidity of the bowels may probably be due to the introduction of large quantities of irritating and indigestible substances. The people being coarse and reckless feeders, swallow, besides badly ground oats, the skins of potatoes, gristle, fish-bones, etc. I think it will be found that where oatmeal is much used, comparatively large doses of purgatives are required.

Diarrhœa, a very common disease in Shetland, was always very intractable in my hands until I commenced the use of hot milk in draughts of about eight ounces repeated every half-hour. Simple cases almost always begin to yield to this treatment after the second or third draught.

Typhus Fever.—In most cases, the ordinary mode of treatment, especially as regards ventilation, clothing, and careful watching, is utterly impracticable. The latter is particularly difficult to carry out, the patient being deserted by his panic-stricken friends as soon as the nature of the disease becomes known. Almost the only fatal cases are those of aged persons. As a general rule, those

individuals who occupy the poorest dwellings, make the best recovery, the ventilation being tolerably free, and the administration of alcoholic stimulants often impossible. In the so-called better class of houses, the bedrooms are low garrets, affording every facility for the exclusion of the much dreaded fresh air, and the friends of the patient are able to procure wine and spirits in abundance. In the earlier stages of typhus, milk, with a very small quantity of bread, seems to be the best diet, alcoholic stimulants seldom being required, even during convalescence. Under this mode of treatment, there were only two deaths in seventy-four cases during the last epidemic, a very low average considering the many disadvantages to which the patients were exposed. Formerly, when "nourishing" food and spirits were more freely administered, the average was far higher.

I can call to mind two instances of the sudden re-appearance of typhus after an interval of more than a year, upon the removal of some old fishing nets and other lumber which had lain undisturbed since the last outbreak of the disease.

Phthisis.—The general belief that, until lately, Shetlanders enjoyed a perfect immunity from phthisis, is entirely without facts for its support. Even the official records themselves, which seem to bear out the supposition, are valueless, for, it should be observed, many deaths are still registered as caused by chronic bronchitis and congestion of the lungs, which a regular medical practitioner would have unhesitatingly attributed to phthisis, had his opinion been asked. It should also be remembered, that, even a few years ago, the stethoscope was but little used here, and that the disease being considered of syphilitic origin, people of all classes are exceedingly averse to admit its occurrence in their families. Whatever may have been the case formerly, I have certainly observed a steady and somewhat rapid increase during the last eight or ten years. The changes for the worse with regard to food, habits, and clothing, have already been mentioned; and while seeking the means of reformation in these respects, it would be well to keep in mind the alarming mortality among young persons of both sexes who leave home at an early period of life to seek employment in the south—females, as domestic servants, males, as light porters, shopmen, and a few as sailors. The sudden and complete change acts most prejudicially: their industry and willingness to oblige lead to overwork, the amount of sleep is diminished, the appetite is indulged, and where there is a tendency to phthisis; "a bad cough" sooner or later sends them home—for rest as they fondly imagine, but really to almost certain death. Such cases are hopeless, and terminate with

the greatest rapidity when the patient has been long in the south.

Very few families can boast of entire freedom from scrofula, although it is becoming less prevalent—a singular fact when compared with the increase of phthisis. This subject is now in able hands for investigation, and I trust to be in a position to furnish some reliable data in the next report.

With regard to the treatment of phthisis, the old routine is still observed—except in the few cases in which pancreatic emulsion is prescribed. In a country like Shetland, nothing approaching to a satisfactory record can be kept; but my own rough notes give the average duration of life under different modes of treatment, as follows:—

Pancreatic emulsion	28 months.
Cod-liver oil	17 ,,
Without either of the above ...	14 ,,

It should be observed, that in almost every case, medical aid is only first sought after the disease has become thoroughly established; and that although the superiority of the emulsion over the oil is beyond all doubt, the patient very soon becomes unable to take the latter, when, finding his health rapidly failing, he "loses heart," and can seldom be prevailed upon to attempt any other measures for its restoration. Notwithstanding the fondness of Shetlanders for fish oil, in various forms, perhaps nine individuals out of ten entertain the greatest disgust towards it when prescribed medicinally. It is often recommended in the form of the favourite "liver brunie," made by placing fish livers upon the top of a thick oatmeal cake and roasting before the fire, a mode of administration which no stomach can long endure. When the oil can be taken, it is by far the best way to give the dose after the commencement of a meal.

Ulcer of the Stomach.—Some years ago, Shetland was notorious for this disease, which resisted all the ordinary modes of treatment. The symptoms usually occur to young women of hysterical habit, and nearly always yields to the usual treatment of hysteria.

Scriveners' Palsy.—Medical aid is occasionally sought for an affection of the thumb and forefinger of one hand or both, closely resembling "Scriveners' palsy." It only occurs among knitters, and invariably in those who use brass knitting pins. It was formerly very intractable, but now, the recommendation to substitute steel, or wooden pins, if followed, always results in complete recovery.

Vesical Calculus.—One case only has occurred "within the memory of the oldest inhabitant," and the subject was not, as far as can be ascertained, a native of Shetland.

Epithelioma, in a very obstinate form, sometimes attacks the lips of fishermen during summer. It is caused by the habit of holding the "snood" in the mouth while attaching or removing the bait—hence the right side is diseased in right-handed men, and the left side in the very few that are left-handed. Only the lower lip is affected.

Obstruction of the Bowels is of somewhat frequent occurrence in spring, when the people are engaged in spade labour, it being at that time the custom to partake at noon of a hasty but heavy meal of potatoes, and immediately to resume work. These cases nearly always terminate fatally, as it is seldom that medical aid is called in until many hours have elapsed since the commencement of the attack, and the sufferer has been largely dosed with whiskey and black pepper.

Hysteria, in every imaginable form, is common; sometimes proving fatal, when the patient, believing herself paralysed, retires permanently to her box-bed, her sympathising friends humouring every absurd fancy, especially that of closing the doors of the bed, and carefully stopping every crevice to exclude the cold.

Tetanus.—A well-marked case of idiopathic tetanus occurring in a married woman aged thirty-three, yielded to large doses of tincture of hop, which I discovered in a neighbour's medicine chest, and resorted to almost in despair during the protracted absence of a messenger to my own house. It is only proper to add, that pain being complained of in the region of the uterus, hot fomentations and vaginal injections of warm water were assiduously employed until after the third dose.

Hypochondriasis.—All Shetlanders are predisposed to this inevitable result of want of employment during the long winter and careful study of popular works on "Domestic Medicine."

Scurvy seldom prevails to any serious extent, and only after a deficient potato crop. The people entertain so great an objection to vegetable food, that cure is always difficult. The liberal employment of phosphoric acid is invariably followed with success.

Hernia is common in both sexes, and is usually caused by over-exertion with the spade, or in drawing boats up a steep beach.

Æstrus bovis (?).—Two years ago a woman of middle age came to me, in the month of April, complaining of large and very troublesome "boils" upon the neck and thighs. A slight opening with the lancet gave exit to large, solitary, larvæ, each measuring about three-quarters of an inch in length. I have preserved a few, and believe them to be larvæ of the breeze-fly (*æstrus bovis*).

Additional Auditory Opening.—In this instance the subject is a

male, having in each ear a small orifice piercing the lower third of the helicus major, and extending downwards into the external meatus. The upper portion of the tube will barely admit the end of a probe, but the lower end is slightly wider. A small quantity of wax, thin, and of a very light colour, occasionally exudes. Hearing has always been remarkably acute. When the ordinary openings are carefully stopped, the ticking of a watch can be heard distinctly at a distance of about six feet, but on closure of the smaller openings, no sound can be perceived until the watch is placed in contact with the ear itself. The subject of this singular malformation has six children, to only one of whom—the youngest—has it been transmitted, and in this case it is present in the right ear only.

Cod Liver Oil is always best and cheapest when home-made. Nothing more is necessary than to cut each liver into four or six pieces, put them into cold water, boil carefully over a clear fire, and skim off the oil as it rises to the surface. In this state it will keep well for about a week in warm weather, but for many months, if carefully washed in the following simple manner:—Place equal quantities of the oil and water in a bottle, shake together thoroughly, invert the bottle, placing the thumb over the mouth, and when the oil rises, allow the impure water to run off, replacing it with pure, and repeating the process as often as may appear necessary. I used to put a tablespoonful of whiskey into each pint of oil before sealing up, but now substitute a few drops of oil of nutmeg, or any essential oil upon the lower end of the cork. Dr. Edmonston has in his possession a specimen of the oil made by himself thirty-two years ago. It had been carefully washed, and, without the addition of any "preservative," except pure water, is now perfectly clear and free from all disagreeable odour.

Oakum as a Substitute for Tow.—For the last few years I have been in the habit of using carefully teased oakum as a substitute for tow, especially as a padding for splints. It at least possesses the advantage of a preventive to *parasites*, which in Shetland are frequently so numerous and troublesome as to necessitate the removal and re-adaptation of carefully applied splints and bandages.

Sand and Grass-Roots as Padding for Splints.—In fractures of most kinds which necessitate the confinement of the patient to bed, and especially in compound fractures, I find sand-bags extremely useful. I first used them in a case in which not even grass or straw could be obtained, and with such satisfactory results that I have ever since made use of them in cases which would permit of

the employment of a box instead of splints. Wooden pegs inserted in various parts of the box afford a means of attachment for bandages to keep the limb in proper position, while sand-bags, which readily receive and retain any desired form, afford additional support. I usually enclose the sand in thin gutta-percha, uniting the edges by means of hot water. Not the least among the advantages of these bags is their cleanliness. In fractures which do not require confinement to bed, *grass-roots* form a far better padding for splints than tow, wool, or blanket. They are light, elastic, and do not "pack" after a few days' use, as is the case with most other substances employed for this purpose. Grass-roots are easily obtained in sandy places near the sea, where rabbits and the weather have undermined the sand banks and caused the herbage to overhang.

Leaks in Roofs.—No country surgeon ought to be above taking a useful hint; therefore I may mention that when there is a leak in the roof above the unfortunate patient, a good substitute for the plate or bowl usually placed beneath, is a few twists of *wet* worsted, fastened to the orifice in the roof by means of a pin, and thence conducted to the bed-side, or even to the window.

Carriage of the Wounded.—When a man falls over the rocks or is injured by an explosion in the quarries, his companions often lose much valuable time in conjectures how to remove him from the scene of the accident. In such cases, oars, or spade handles are nearly always at hand, and if run through the arm-holes of jackets or waistcoats, afford an admirable mode of conveyance.

Sea-tangle Stems form a very good substitute for waterproof tubing when a continued flow of water is required towards one particular spot. To make a tube in which to place the cotton or worsted, take a piece of thin iron hoop, or tin, sharpen one side with a file or a rough stone, and, rolling it once round, place the edge at right angles to one extremity of the sea-tangle stem, draw it from end to end, cutting out a core, and leaving a tube of the required diameter. In most parts of Shetland, stems of sea-tangle (*laminaria digitata*) may, sometimes, be found fifteen feet in length.

TURKEY.

*** [The rest of this volume was ready for the binder, when the telegram referred to in the footnote arrived, announcing that Dr. Sarell's long-expected manuscript would be despatched immediately. It was thought better to delay for a short time the appearance of the work, than to omit so novel and interesting a Report.—ED.]

Report by R. SARELL, M.D. EDIN., *Physician to the Imperial Maternity Hospital, Constantinople, etc., etc.**

TURKEY could hardly claim a place in a volume devoted to "Reports on the Progress of Practical and Scientific Medicine," were it not interesting to place, side by side with the evidence of the daily increasing perfection of the art and science of medicine among the nations oldest in civilisation, some account of its present state in the semi-barbarous East, where it is only just beginning to move slowly forward in the wake of European progress. Within the boundaries of the Turkish empire the earliest medical schools of antiquity were founded and flourished, and the science there created by the genius of Hippocrates and Galen, lived for a while under the rule of the Arabs. But the Turks, who overran and destroyed both the Arabian and Byzantine empires, were utterly incapable of succeeding to the civilisation, or cultivating the arts and sciences, of the races they conquered. Possessed of a poor and defective dialect, they adopted with the religion of the Arabs their language in their religious ceremonies, and this circumstance checked the development of a national language and literature. Learning was confined to ministers of religion, who were at the

* Extract from a letter accompanying Dr. Sarell's Report:—

"Constantinople.

"I hope my telegram came in time to induce you to wait for my report. As some excuse for my delay in sending it, I may mention to you that in the fire which destroyed Pera in June, my house and all its contents, including a valuable library and instruments, as well as materials already collected for you, were utterly destroyed. Not only had I to begin over again, but I was obliged to live in the country at a great distance from my practice, and I had scarcely any time for literary labour. It is only within the last seven or eight weeks that I have been able to finally settle again in town, and attend seriously to the Report, which, however, even then took longer to prepare than I had anticipated."

same time lawyers—the "*Ulema*;" and their learning was limited to reading and copying the Koran and its commentaries. Under such circumstances all recollection of the Greek and Arabic schools of medicine soon vanished, and no others took their place. The practice of medicine dwindled into superstition and empiricism.

The Turkish priesthood, imitating the religious orders in other nations, claimed powers of healing, but without any traditional knowledge or experience. They relied on the grossest credulity; and, strangely, their pretensions were allowed, and are maintained to this day, not only by the ignorant among their own people, but also by the uneducated Greeks, Armenians, and even degenerate Franks, who inhabit the suburbs of Turkish cities. Their practice consists either in the imposition of hands during the muttering of prayers, or of selected verses of the Koran; in treading with the feet the patient, stretched on his face on the floor; in blowing on him the natural breath, or the smoke of a piece of paper, on which has been written an effective verse of the Koran. The ceremony of healing the sick is publicly practised at the conclusion of their religious meetings by the *sheikhs* of the howling *dervishes*, and also by the *sheikhs* of other orders.

The sultans of Turkey, from an early period had a *Hekim-bashi*, or chief doctor; and in the reign of Mahomet II., the conqueror of Constantinople, we find a renegade Jew, Hekim Yacoub, occupying this post, with a salary of 2,000 aspers per month. At this period the Jews everywhere enjoyed a reputation as apothecaries and doctors; in the East they have retained this reputation to this day. In almost every town or village the Jew apothecary may be seen, sitting behind a counter, in the most wretched of shops, with an array of old and dusty vials and boxes before and behind him, as if the efficacy of his nostrums depended on their vetusty. Not only Turks, but Christians frequently apply to him, and the reckless manner in which he handles the most potent medicines is frequently the cause of serious accidents. The shop is then shut for a while, to be re-opened again in a few days, when the fury of the neighbours has abated.

The Turks are not qualified for the study of medicine; they lack the powers of observation and deduction, so essential to its successful pursuit. However, the practice of circumcision, enjoined by their prophet, has produced among them a class of barber-surgeons, who undertake some of the minor operations of surgery.

Other Eastern races furnish more claimants to skill in the art of healing. Thus, the *Adjenes*, or Persians, and their neighbours, the Armenians have supplied from time immemorial the bone-

setters or *Kirikjis;* these bone-setters still enjoy the unbounded confidence of all classes of the population in the treatment of fractures and dislocations, and it is not uncommon in Constantinople to hear an otherwise intelligent European say, in a case of fracture, "Oh! that is not a case for the doctor; we must send for the kirikji." No doubt, the kirikjis can set an ordinary fracture, and reduce some dislocations; but they often commit gross blunders, and their practice falls far short of the requirements of modern surgery, and in consequence their star is rapidly waning.

The Roumeliotes, or Macedonians, supply the kanikjis, whose speciality is the cure of hernia; they reduce hernias, and construct bandages to contain them. Some of them are very skilful, and succeed where strangulation seems imminent, and nothing but the knife likely to give relief; their method consists in drawing gently a little more of the bowel through the ring, so as to free the constricted portion, and then by careful malaxation emptying it of its contents as much as possible before attempting to restore it to its place. Repeated practice makes them dexterous in this manipulation; when it fails, they never resort to the knife, but abandon the case as incurable. The bandages manufactured by them, though clumsy and heavy, are borne by our tough and hardy population, but they would not for an instant suit the more sensitive Europeans.

The Albanians devote themselves to the diseases of the testes, and even practise castration in some cases. They are known as *Tastrakjis.*

Such were until recently the only representatives of indigenous medicine, excepting an inumerable horde of panacea and nostrum-vendors, unworthy even of a passing mention.

In the capital and some of the larger cities there were to be found usually a certain number of foreign practitioners, chiefly Italians, and, with few exceptions, of very inferior education; some of them, mere pretenders without any qualifications, were indistinguishable from the crowd of native quacks, with whom they alternately fraternised and quarrelled at the bedside. But if our *Sangrados* were poor in science, their appearance was magnificent. All professions wore a distinctive costume, and the doctor's dress was most imposing; his scarlet breeches fell in ample folds over yellow slippers, a cashmere shawl girded his loins, covering a brusa or damask silk *anteri*, or stomacher, and supporting a massive silver inkstand, stuck in his waist; over all he wore a long fur pelisse, descending to his ankles, and on his head a sable *kalpak*, topped with scarlet, not unlike a hussar's kolbach. In his

progress through the streets, seated on a mule, the doctor was preceded by a dragoman, or interpreter, who carried his drugs and his pipe, and who was also his crier, announcing his passage to the people, crying as he went along, "Ὁ καλὸς ἰατρὸς! *Ei hekimm!* A good doctor!"

Such was the state of medicine in Turkey till the destruction of the Janissaries by Sultan Mahmoud II. It was a dark time, darker than the night of the Middle Ages in the West, for there, towering over the hordes of empirics, appears here and there a bright genius, shedding light around him, and sowing the seeds of future progress; but here nothing broke the dead level of ignorance and quackery.

With the destruction of the Janissaries commences a new era for medicine in Turkey. At about this time there had settled in Constantinople, as physician to the English factory, a Scotchman of very remarkable attainments, Dr. Samuel McGuffog; he soon obtained an immense practice, and raised high the estimation of British medicine, becoming widely known as the great English doctor, *buyuk Inglis*. A perfect gentleman, as well as an accomplished physician, he stood aloof from the wretched intrigues on which practitioners had hitherto relied, and while fulfilling his duties, he maintained the rights of his profession, and secured proper respect, aye reverence, from all classes of the inhabitants. He died some fifteen years ago, leaving no medical writings, but having greatly advanced the cause of practical medicine during a professional career of more than forty years in the country.

Shortly after McGuffog, two English physicians had settled in Constantinople and shared his practice. One of them, McCarthy, who died about ten years ago, was known as the *Kutchuk Inglis*, or minor English doctor; the other, Dr. Millingen, who still enjoys a well-earned reputation in this capital, followed Lord Byron to Greece, and came here after the death of his patron.

McCarthy and Millingen were both attached to the court of the reigning Sultan, Mahmoud, and contributed to place the medical profession on its proper footing. Their success, and the increasing facilities of communications induced a number of European, Greek, and Armenian families to send their sons to study medicine in Europe, and thus gradually has been formed in this country a medical body respectable both in numbers and in talent.

The new political regime instituted in the reign of Mahmoud II. influenced the future of medicine. The destruction of the janissaries led to the organisation of a regular army, and to the foundation of military schools to educate the officers, and of a medical school to furnish the requisite medical staff. At the same time, to stay the

ravages of the plague, nearly always present epidemically in some part of the empire, "the Superior Council of Health of Constantinople" was established, and sanitary officers under its orders sent to all the principal ports and inland towns; stringent quarantine measures were adopted, and certainly *post hoc*, if not *propter hoc*, the plague disappeared. The necessities of a regular system of quarantine administration distributed a large number of qualified medical men over the empire, and from this source have been derived a number of interesting reports on the medical topography of various districts, on the prevalent endemic and epidemic diseases and other kindred subjects, forming most valuable contributions to sanitary science.

When the Crimean war broke out in 1854, Constantinople became the centre of the medical establishments of the allied armies, and the rendezvous of a vast number of military surgeons, English, French, and Sardinian. It occurred to Dr. Pincoffs, who was then serving in the English military hospital at Scutari, that it would be highly interesting and useful to organise regular meetings which would bring together the medical staff of the allied armies and the local practitioners; and his suggestion having been warmly taken up, especially by the French surgeons, a medical society was founded and incorporated as the Imperial Society of Medicine of Constantinople. From this time, 1856, dates a new era for medicine in Turkey. The medical society brought together the scattered members of the profession, taught them to know and appreciate each other, and enabled them to command the respect of the people. The practice of medicine, till then a mere craft, really became an honoured profession; and scientific thought, research and skill, received their meed of honour and reward. The society held fortnightly meetings, and commenced the publication of the "Gazette Medicale d'Orient," which helped to establish and maintain its influence.

The foundation of the medical society and of its journal, the "Gazette Medicale d'Orient," was hailed with warm interest by the older institutions of Europe, and its publications were favourably noticed in France and Germany, but are little known in England.

The Imperial Medical School, the Superior Council of Health, the Society of Medicine, mark three stages in the progress of medicine in Turkey. I will consider their influence separately.

THE IMPERIAL MEDICAL SCHOOL OF CONSTANTINOPLE was founded in 1827 by Sultan Mahmoud, who appropriated to its use the buildings of Galata-Serai in the centre of Pera, formerly a school

for imperial pages. "Nothing was omitted which could ensure the prosperity of the institution; the buildings were commodious and in a central situation, easy of access; the material means of study—library, instruments, collections of all sorts, botanical garden—in short all those accessories without which the most learned professors can only teach imperfectly, abounded in Galata-Seraï."* The sovereign took the liveliest interest in the success of the school, visiting it every week in person, assisting at the examinations of the students, and encouraging them in their studies. The teaching was in the French language, and the professors had been recruited, partly from among the local practitioners, partly imported from Germany. Unfortunately in 1848, fire, the scourge of Constantinople, destroyed the school and all its valuable contents, and they have not yet been replaced. After the destruction of Galata-Seraï, the school took refuge in an old and inconvenient barrack at the top of the Golden Horn, and notwithstanding all the efforts of its professors, there it remained for eighteen years, nothing being done to replace the library and collections. At last in 1866, it was transferred to a more convenient situation in the centre of the gardens of the old palace at the Seraglio point, and at the same time a new director was appointed, Salih Effendi, himself a former pupil and professor, and warmly interested in its prosperity. The school has educated, in the space of 44 years since its foundation, about 400 doctors; of these about 150 are employed in the army, and the remainder are either dead or engaged in civil practice. But it has many deficiencies, some due to local circumstances, others inherent to its constitution. The school, originally placed under the control of the military department, has remained there ever since, much to its injury. This department is administered by a council, the *Dari-Choura*, whose members have either no education at all, or what is worse, have passed through the local military schools, and there acquired that self-sufficiency arising from an imperfect knowledge, which is a hundredfold worse than ignorance; and their stubborn incompetence or fanaticism has opposed all efforts at improvement, and now threatens to destroy the school altogether by attempting to abolish the use of the French language.

"On the proposal of Dr. Ahmet-bey, the *Dari-Choura* has decided that the Turkish language shall be used in teaching at the imperial school of medicine. The reasons put forward and adopted by the council for this decision are as follows:—The

* "Gazette Médicale d'Or.," T. viii., p. 131.

Mussulman pupils, although twice as numerous as the non-Mussulman, do not as a rule improve as they ought to do; in the higher classes their numbers diminish seriously, owing to the difficulty they find in mastering a language not their own; this difficulty once set aside, they would keep pace with their Christian fellow-students;—in all European countries medicine is taught in the national tongue."*

To these specious arguments Professor Mavrogeny authoritatively replies:—

"1. Till a very recent period, in all the schools and universities of Europe, the sciences were taught in Latin, and this preference for the Latin language prevailed till the language of each country became enriched with the expressions and technical terms proper to each science. We defy Ahmet-bey, who is also a professor of the imperial school of medicine, to discuss on any disease, much less to give a lecture, in Turkish, his mother tongue, unless he makes an indiscriminate use of Arabic terms, the applicability of which might be contested by more competent authorities than himself, and which would not be understood by his auditors. In the University of Vienna, between the years 1835 and 1845, I found from personal experience that several branches of the medical sciences were taught in Latin, although there was no lack at that time of manuals and treatises in German; as for Greece, cited by Dr. Ahmet-bey in support of his argument, it is quite true that Greek was at once adopted in the University of Athens; but Dr. Ahmet-bey forgets that Greek is essentially a scientific language, and that in every other language, ancient or modern, almost all scientific terms are derived from the Greek; even now, when a new invention or discovery in art or science renders necessary new terms to express new ideas, they are usually derived from the Greek, and this circumstance only two years ago prompted a member of the Institute of France, M. G. d'Eichthal to propose that Greek should become the universal language of science in Europe.

"2nd. The Imperial School of Medicine, although entailing heavy expenditure on the state, after more than forty years' existence, has been unable to supply the number of doctors required by the army list, and *a fortiori* it has failed to furnish the provinces with the number of doctors sufficient to meet the wants of the people, and cope with the ignorant charlatanism which infests the country. And yet every year a reasonable number of pupils come

* Professor Mavrogeny: La langue turque comme langue d'enseignement des sciences médicales ("Gaz. Méd. d'Or." Nov., 1870.)

up to the school; in the elementary classes of the preparatory school, especially in the first class, the number of pupils often exceeds a hundred; but in the medical classes this number falls off to forty, twenty, and sometimes even to eight. What is the cause of this melancholy shortcoming? Dr. Ahmet-bey pretends that the only obstacle to a more successful result is the use of the French language in the classes; but is it so in reality? To study medicine with success, the intelligence must already have been cultivated by the study of literature, the physical sciences, and philosophy. In France, to be admitted to a medical school, the student must present the diplomas of bachelor of letters and bachelor of sciences. In Germany, after leaving the elementary schools, he must attend for six years a gymnasium, and study two years philosophy in the University; all this represents in France and Germany from two to twelve years of preparation. What obtains with us? The medical school is divided into two sections,—the first, or preparatory school; the second, the school of medicine proper. To enter the preparatory school it is only necessary to read a little French and Turkish, or even Turkish alone; the course of study runs over four years, and in this time the pupils are expected to learn Turkish, Arabic, Persian, and French, besides geography, cosmography, general history, and especially Turkish history, arithmetic, algebra, geometry, and the elements of philosophy; they are lodged, boarded, clothed, and even paid. They pass an examination at the end of each year, and at the end of four years, without undergoing any general examination to test their fitness, they go up to the medical section, where in six years they are initiated into the natural and medical sciences; their pay continues and even increases as they rise in their classes; they are examined at the end of every year, and, after the eighth class, pass a general examination, divided into five parts, which finally gives them the degree of doctor of medicine and surgery. It is evident that in so short a time a youth of ordinary intellect cannot digest all these subjects, which fall like an intellectual avalanche on his astonished head; it follows that with rare exceptions the only pupils who succeed in the study of medicine are those who join the medical classes after obtaining elsewhere a sound general education."

Professor Mavrogeny concludes, that at present Turkish cannot be the language used in teaching medicine; in the mean time it is not necessary to rescind the imperial order, but, to render possible its application at a future period, he proposes:—

1st. "To reform radically the board of translations which has existed fifteen years, and in that time has been able to produce only

one bad translation of a manual of anatomy. The new board of translations, composed of able and competent men, would first occupy itself with the formation of a fixed scientific terminology, and then have to produce a complete medical and surgical encyclopædia and another encyclopædia of the physical and surgical sciences, by selecting and translating the best works in French, German and English."

2nd. "To reform or even to abolish entirely the preparatory school, and in future to admit into the medical classes only such pupils as have already obtained a satisfactory general education, and can produce certificates equivalent to the diplomas of bachelor of letters and bachelor of sciences."

In the mean time it is evident that if the Turkish language is imposed on the professors, the Turkish pupils who already learn French indifferently will not learn it at all in future; the meagre class lectures will be their only resource, and their efficiency will be very much impaired.

Salih Effendi, the director of the school, is well aware of its requirements, and strives hard to make good its deficiencies and improve its educational resources; but his best endeavours break down before the prejudiced ignorance of the *Dari-Choura*, which has not yet learnt to appreciate the full value to an army of an efficient medical department. He opposed the adoption of the Turkish language, but his opposition was of no avail, and so long as the medical school is not placed under a more enlightened department, as that of public instruction of recent creation, it will not receive all the development of which it is capable.

The Superior Council of Health of Constantinople survived the disappearance of the plague, which had not been seen in the capital since 1838, in European Turkey since 1840, in Asia Minor and Syria since 1843, in Egypt since 1844; and quarantine rigours were but little relaxed till 1851, when an international sanitary conference held in Paris adopted a new system of regulations, less severe, but still imposing vexatious restrictions on the entire liberty of communication even in seasons of perfect health. Public opinion became loud against quarantine, and was supported by the opinions of many scientific men, who seriously doubted its efficacy, and attributed the disappearance of the plague to more natural causes; and although quarantine-doctors as a rule naturally held to the institution whose regulations it had been their duty to enforce, some important defections occurred among them. Dr. Bô, Director of the Sanità of Genoa, who had represented Sardinia at the Paris Conference and had been a warm contagionist, published a

remarkable work:—"De la doctrine des principes contagieux et des maladies contagieuses, considérée dans ses rapports avec la prophylaxie publique," in which he maintained the utter fallacy of quarantine regulations, and proposed their entire abolition. This unexpected attack from such a quarter caused a great commotion in the quarantine camp throughout the Mediterranean, and called forth a reply from a member of the Sanitary Council of Constantinople, Dr. Marchand, who had taken an active part in the administration of quarantine since its introduction into Turkey,* and had witnessed several epidemics of plague. Nevertheless, the system seemed doomed to succumb to an increasing unpopularity, when an unexpected event gave it a new lease of life. An epidemic broke out, July, 1858, in the province of Tripoli in Barbary, in an Arab encampment some eight hours' distance from Benghasi, and spread to that town; the quarantine doctor on the spot at once gave notice to the Constantinople Superior Council of Health, but while calling the epidemic typhus, he described suspicious symptoms, which made it desirable to obtain further information, and two men of undoubted competency were dispatched to the spot, Drs. Bartoletti and Amadeo. Their report left no doubt as to the nature of the disease; it was the plague with its usual characteristics, intense fever, delirium, prostration, vomiting, buboes, petechiæ, carbuncles, the latter in a limited number of cases. It was the plague with its usual malignity, its rapid march, its manifest tendency to propagation. It existed not only in Benghasi, but in four or five other districts in the province of Tripoli, and especially at Druna; at Benghasi alone, out of an usual population of about 12,000, much diminished by the flight of the inhabitants, there had been in the months of May and June about 1,500 attacks and 800 deaths. Dr. Bartoletti's report stated in conclusion, that "the plague had originated spontaneously, and by a concourse of extraordinary circumstances and accidents (extreme misery caused by protracted drought and famine, and also a murrain) in the Arab encampment of Amalisgalon Fiddaar, and from thence had spread by contagion. "As for the efficacy of the measures adopted against it," he adds, "let us have confidence, the future will bear us out." † These measures were,—strict quarantine against all arrivals from the province of Tripoli, and also from Alexandria and Malta, which had communicated with the infected locality; and at the same time a medical commission was sent "with the necessary authority and the requisite means to act efficaciously on the spot against

* "Gaz. Méd. d'Or.," T. i., pp. 56, 79.

† "Gaz. Méd. d'Or.," T. i., pp. 81, 105, 110.

the progress of the plague, and to stifle it in the place of its origin."

The chief of this Commission was Dr. Barozzi, who remained many months in the province of Tripoli, studied carefully the origin and characters of the epidemic, and published a tardy but most interesting report; its publication commenced in the "Gazette Médicale d'Orient," in 1861, and was concluded only in September, 1869.

The re-appearance of the plague, after a total absence for more than fourteen years, was a remarkable event, and caused a great sensation; the accuracy of Dr. Bartoletti's original report had been called in question, in Germany especially, and by no less an authority than Virchow; but Dr. Bartoletti's competency to observe and his accuracy to describe are above suspicion, and the later and fuller report of Dr. Barozzi leaves no doubt that the epidemic of Benghasi was really the plague.* "The disease was characterised by buboes in almost every case, by carbuncles, by petechiæ, and by a *facies* quite peculiar. These morbid appearances were preceded, accompanied, and followed by general symptoms which gave them a pathognomonic character; . . . pains in the glands of the groin, of the axilla, of the neck, fugitive, pulsating, more or less intense, increased by movements or pressure, marked the invasion of the disease; soon after, a state of indescribable suffering, of prostration progressive and general, of marked depression of spirits, was followed by lassitude in the limbs, lumbago and disgust for food; this condition—lasting only a few hours in the smallest number of cases, in others one or two days, rarely three, and still more rarely four—was complicated by erratic rigors alternating with heat, intense frontal headache, nausea, vomiting first of the food only, later of yellow, green, and black matter, slight febrile movement, vertigo. The sufferer takes to his bed while the initial symptoms persist and even increase in intensity, the fever becomes considerable, the skin dry, and the temperature of the body greater; the patient complains of a burning heat inside, and this sensation is at its maximum in the throat and nostrils; the pulse is frequent, strong, hard, contracted; or weak, small, and filiform, according to the stage of the disease; the respiration is accelerated and oppressed; the thirst great. The head is giddy, the gait faltering, as of a drunken man; standing becomes impossible, the knees bend, the arms are flaccid and pendulous on the sides of the body. The head falls to one side as if dislocated; the features are

* "Gaz. Méd. d'Or.," T. vi., p. 153. Barozzi, Relation de la peste qui à regné dans la province de Benghasi (Cyrénaïque) en 1858-59.

profoundly altered; the countenance expresses at once fright, discouragement, and stupor; the "titubancy" and *facies* have a character *sui generis*. The speech is slow, or precipitate and *brusque*, or there is muteness; the voice is trembling, as if cracked, or grave and guttural; the patient seems to be trauling; the ears sing, and the hearing is hard.

"The eyes and the looks especially attract the attention of the observer, and strike him with their peculiar expression, difficult to describe; in the majority of cases the eyes are humid, weeping, brilliant, half covered by the eyelids, red at the inner angle; the pupils are dilated and contract only at the last stage of the disease; in this condition their expression is difficult to describe, a sentiment of melancholy, calm and resigned; at other times the eyes are much injected, always half shut, the cornea unpolished in places; then the expression is sombre, ferocious, haggard.

"The tongue shows the following characters: at the beginning almost always large, humid, red at the tip and at the sides, nacreous or grey in the middle; bluish, cyanosed, livid, or covered with black spots at a more advanced period; rarely the teeth are fuliginous; the breath is warm, inodorous; there is constriction at the epigastrium, constipation, sometimes diarrhœa; the motions are yellowish, black; the urine loaded and scanty, or light and abundant; there is hæmorrhage from different sources in the worst cases; the sufferers are tormented with sleeplessness; their delirium is generally tranquil; sometimes they fall into drowsiness and coma.

"Generally at the beginning or in the middle of all these attendant symptoms, more or less marked in intensity, buboes and carbuncles broke out, and petechiæ appeared. They showed either alone or combined, at different stages of the disease (to be determined hereafter), and impressed on it an undoubted individuality as to its nature. To the pain and fulness in those regions where lymphatic ganglions exist, succeeded tumours, round, oblong, or conical, smooth or uneven, more or less voluminous, painful, warm, moveable, and usually seeming to be set in the surrounding cellular tissue; the skin covering these retained its natural colour; it assumed, however, a rosy or violet hue when these tumours were going on to suppuration, or it became livid as the state of the patient was aggravated. These tumours appeared suddenly of a considerable size, or grew slowly; they occupied in preference the upper and inner part of the thigh, the groin, the axilla, the parotid region; in some rare cases they were developed in unusual places, over the clavicle between the nates, etc., almost

always prominent; there were also some deeply situated, to be discovered only by palpation; they frequently went on to maturity; at other times they remained stationary for a while, became permanently indurated or were slowly resolved; they never sphacelated; when they burst they discharged, from an irregular fringed opening, pus, generally of a good character, mixed with a little blood, at other times badly formed, fœtid; or the discharge was ichorous; the cicatrisation never presented anything unusual, beyond the delay in some cases; below and around the cicatricial tissue, an induration could be felt, which I have known to subsist for eight months. Simultaneously with or after the appearance of buboes, there appeared on different parts of the body, face trunk, limbs, nates, a puffiness, at first circumscribed but assuming in the space of a few hours considerable dimensions; at the salient point of these swellings on the skin could be seen a little papula, and in its centre a vesicle filled with serum and blood; the vesicle soon burst, and the initial point spread, retaining its rounded form; the part supporting it swelled; the tumefaction extended to the neighbouring regions, and to a distance, and became painful; soon gangrene set in, and when the ichor was eliminated, a round wound remained, from one to four centimetres in diameter, as if cut out with a punch. To these two morbid products (buboes and carbuncles) was superadded at the period of greatest intensity of the disease, another symptom, often the presage of a fatal issue, petechiæ: I have seen them very large, olive-shaped, livid, black, twice only red; they appeared in all parts of the integuments and on the tongue. In some cases, and they were the worst, they literally covered the body.

"The progress of the disease was rapid, its duration short, less than a week in general, only a few hours in the worst cases; in the majority its termination was fatal. If the issue was to be favourable, this series of formidable symptoms rapidly amended; convalescence set in promisingly, irrespective of secondary accidents, the day after the profound general perturbation I have attempted to describe; the dryness of the surface disappeared; the skin became moist and often perspired freely; the circulation and respiration became regular; the strength returned; the buboes suppurated or were resolved; the gangrene was limited and the loss of substance repaired; the countenance resumed its composure, and the danger was over. But if death was to ensue, the patient rapidly fell into stupor; cold sweats covered his face, and death without agony followed when least expected."

This graphic description of the disease is drawn from a number

of carefully collected cases observed by Dr. Barozzi, in the plague hospital opened by himself in Benghasi; fifteen of these cases, in which the symptoms had been carefully noted day by day, are published *in extenso* in the "Gazette Médicale d'Orient," and they fully justify the conclusion that the disease was no other than the plague, *pestis bubonica*; all the doctors who had occasion to observe it, they were eight in number, came to the same conclusion.

Dr. Barozzi's researches failed to confirm the opinion that the disease had suddenly originated in April 1858, in an Arab encampment; on the contrary, the evidence collected by him tends to show that it had existed, with less virulence it is true, throughout the Regency so far back as in May, 1856, and had appeared simultaneously in several districts: it further shows that it could neither have been imported, nor derived from the development of latent germs surviving a previous epidemic, of which none had been observed in the country for a period of fourteen years.

"The plague* originated spontaneously in the province of Benghasi. This spontaneous origin noways contradicts the principles of modern pathology, as it is admitted in diseases undoubtedly virulent; it is admitted also in diseases like the plague, of which the virulence is much contested..... The epidemic appeared at the same time and with the same intensity wherever the causes existed which, in my opinion, produced the plague..... The simultaneous appearance of the plague on the Tell and on the table-land of the Cyrénaïque, proves that a *general cause* alone can have produced the epidemic. This general cause was famine, the frightful and profound misery which tortured the country during six years; indescribable calamity, of which I have endeavoured to give a faint, very faint idea at the commencement of this report. The prolonged drought which destroyed all the cattle, was followed by a frightful famine, and this caused the plague. Famine, a general cause, caused simultaneously in all parts of the country a general disease; nothing is more logical. To form an idea of the extent of the famine, it is only necessary to remember that the unfortunate Bedouins were reduced to devouring putrefying human bodies.... I well know that famine has not always and everywhere occasioned the plague..... But has not every region, every district, its own special productions? The plague appears in Lybia under certain conditions, and famine is the determining cause.

"The spontaneous origin of the plague of Benghasi†, and its simultaneous appearance at a great number of points distant one

* "Gazette Méd. d'Or.," T. xiii., p. 52.

† Ibidem, p. 34.

from another, establishes peremptorily its mode of transmission. The plague was propagated like epidemic diseases, by the sole action of its epidemicity, and quite independently of the agency of contact..... I completely failed, after minute and often repeated enquiry, to establish any affiliation whatever between the infected districts—any chain of facts establishing in a positive and certain manner the influence of contact with the sick.....But in the absence of established facts shewing the transmissibility by contact, direct or indirect, in the epidemic focus, there are many others well authenticated, shewing that contact with the pestiferous, with their effects, etc., did not communicate the plague, either to the locality which remained free near the focus, or at a distance from this focus."

Dr. Barozzi, after adducing numerous examples of unsuccessful contamination (*compromissiones steriles*), both in the province and at Alexandria, and elsewhere, sums up the result of his observations in the following conclusions:—

1. The epidemic disease which reigned in the province of Benghasi was the eastern plague with all its characters.

2. This epidemic originated spontaneously under the influence of general and common causes.

3. Independently of those mysterious influences which produce epidemics, the plague of Benghasi appears to have been engendered by extreme misery, by terrible famine, the result of a long drought, and a severe murrain.

4. This epidemic broke out simultaneously over all the country it scourged.

5. The nature of this epidemic was for a long time mistaken by the sanitary doctors of the town; they mistook the plague for an epidemic typhus non-contagious. In consequence of this error, communications remained free for a considerable time between the country, the focus of the epidemic, and the exterior, and this without any danger to the public health.

6. The greatest duration of the incubation was five days, and the shortest two.

7. The plague of Benghasi propagated itself in the manner of epidemic diseases.

8. No authentic fact afforded me proof that in the epidemic focus the plague was transmitted by contact with the sick, with their clothes, or with effects touched by them.

9. Outside of the focus of the epidemic, contact with the sick, or with their effects did not communicate the plague.

10. Merchandise called susceptible did not carry the plague outside the epidemic focus.

"Whatever may be thought of my interpretation of facts," adds Dr. Barozzi, "in this research I have sought the truth only, and represented it as it appeared to me. The contagionists will say that—unintentionally, perhaps, and preoccupied with my new convictions—I altered betimes its features. But I have with me the opinion of judges more competent than they are in such matters, the opinion of the learned and courageous doctors, who have examined closely the plague in Egypt and elsewhere; who have studied it at the bedside; who have treated it like an ordinary disease; who have lived without precaution or isolation in the middle of pestilential epidemics, earning by their personal risks the right to speak loudly and with authority; these valorous men will recognise the accuracy of my description with all its imperfections, and will give their approval."

In 1867, the attention of the Constantinople Superior Council of Health was called to an epidemic raging among the Arab tribes in a widely different part of the empire, in Hindié, on the banks of the Euphrates, in the province of Irak-Arabi, and Dr. Naranzi, Secretary and Member of the Council, was dispatched to the spot to investigate its nature.* The epidemic prevailed among the Hadji-Off, the Hadji-Nasser, and the Karaktchi, tribes of the Ben-i-Taraf, of Hindié. Dr. Naranzi arrived after the epidemic had ceased, but he collected all the evidence he could from the sheikhs of the Arab tribes, and from a medical commission sent from Bagdad to visit Hindié three months previously, and which had seen the end of the epidemic. The Arabs attributed the following symptoms to the disease, and all agreed that it was non-contagious:—ardent fever, headache, delirium, copious perspirations, buboes in the parotid, sub-maxillary, axillary, and inguinal regions, carbuncles, algidity before death, great and rapid mortality. The medical commission reported especially four cases as follows:—

Case I.—May 24. In the morning we went to the section of Daoum. The disease had not completely ceased. We were shown a certain Hommadi-ben-Hammoun, aged 40, ill seven days. He had had sanguinolent diarrhœa during two days of his illness. At the end of the second day, he had fever of an intermittent type, the exacerbations recurring every hour, and ending in profuse perspiration. Moreover, he felt lancinating pain in the axillæ, without any local manifestation. Movement was very painful. Devouring heat in the abdomen, ardent thirst, natural respiration, urine normal. The next day we found a red spot in front and in

* Naranzi: "Rapport sur l'épidémie du Hindié, dans l'Irak-Arabi en 1867." Constantinople, 1867.

the middle of his right arm, which afterwards became black; the black spot increased; he had involuntary shakes in all his body. This state lasted till the fifth day, when the fever ceased, and the patient passed a quiet night. The next day we saw him; the carbuncle presented a diameter of four inches, and was surrounded by an inflammatory areola. There was a commencement of suppuration.

Case II.—Ecteine Allavi, aged 5, presents in the left groin a bubo of the size of a pigeon's egg. Raving fever, white tongue, fuliginosities on the teeth, constipation, respiration oppressed, eyes red and injected, urine natural; death in 28 hours.

Case III.—Loutfa, aged 4 or 5 years, had a fall two months and a-half since. She had a bubo in the left groin, which suppurated. She had fever and delirium. Her father and mother abandoned her, and she died in a few days.

Case IV.—Belloudji, wife of Nedjim-el-Moustafa, was kneading bread. During her work she suddenly felt in the left groin a severe lancinating pain, which was followed immediately by a bubo, the size of a walnut. This bubo was resolved at midnight, but the pain became stronger and stronger. Besides, she had fever, devouring heat in the region of the heart, intense thirst, white tongue, impossibility of speech, prostration, stupor, constipation. The next day vomiting, three times of bile, and eight times of blood; eyes swollen and red, fuliginosities on the teeth, respiration natural, but embarrassed at the approach of death, urine abundant and yellow. She died in 24 hours.

The Bagdad Commission concluded that this epidemic was no other than the plague.

Dr. Naranzi disposes summarily of these cases in the following lines:—

"Is it necessary by a minute analysis to prove that the symptomatology of these cases shows rather the pernicious nature of the fever which is the foundation of the disease, or rather the disease itself, in all that is essential?

"The first case, can it be anything more than a paludal fever of a dysenteric type?

"The second case can only be, in our opinion, a pernicious fever of typhoid type, accompanied with morbid manifestations in the ganglionic system.

"In the third case there was evidently a slow disease, scrofulous or perhaps tuberculous in its character. To this primitive affection, slow in its progress, a paludal fever of a pernicious character was superadded during the epidemic, and carried off the patient in a few days.

"As for the fourth case, is it necessary to be a doctor to see anything more in it than an inflamed hernia?"

Dr. Naranzi embodies the result of his enquiry in the following propositions :—

A. The spring of the year 1867 was remarkable by two extensive inundations, caused by the overflowing of the Euphrates. These inundations having entirely submerged the plains of Hindié, they were transformed into a vast marsh, where the waters in several places stagnated during nine months.

B. While the inundation was submerging the plains of Hindié an epidemic broke out among the tribes inhabiting these plains.

C. This epidemic appeared spontaneously in two places, not far distant from each other. Later, a similar epidemic broke out in two other places.

D. After having prevailed during four months, this epidemic died out everywhere of itself, and without the intervention of medical art, and without the action of sanitary measures.

E. Sanitary measures were adopted only at the end of the epidemic, *i.e.*, three months and more after its development.

F. During this interval, all the tribes of Hindié continued as usual to communicate with each other, and never ceased to have frequent relations with the neighbouring towns, namely, Tueritch, Hillé, Nedjef, and Kerbela, where the disease did not show itself.

G. The disease never showed a contagious character. Several individuals took care of the sick with impunity, and also touched the bodies of the dead.

H. Similar epidemics had at other times ravaged Hindié. They had been, especially 37 years previously, much more violent than the last, which affected only a limited number of individuals. The epidemic of 1837 is admitted by all to have been the plague.

I. Before and after the extinction of the present epidemic, there were in the same tribes several cases of simple intermittent fever. It is even probable that many such cases passed unnoticed among the Arabs during the epidemic.

In conclusion, Dr. Naranzi compares the epidemic of Hindié to the plague, to the typhus of camps, and to paludal pernicious fevers. He excludes the plague because the epidemic broke out suddenly and died out of itself; because it was not propagated by contagion, and did not extend beyond a very limited area, notwithstanding frequent communications with the surrounding districts; because the number of victims was small compared with the population of the plains of Hindié; because the greater number of deaths occurred without carbuncles and petechiæ; because buboes, although present, were observed only in 3 cases out of 7; finally,

because vomiting, diarrhœa, hæmorrhage, nausea, vertigo, stupor, delirium, and all the principal symptoms of the plague were almost constantly absent, with the exception of some of those symptoms which appeared isolated in some of the cases. He excludes also the typhus of camps and "does not hesitate to class the epidemic among pernicious paludal fevers." "These paludal fevers were accompanied by superadded symptoms, which may be explained by a well marked predisposition to glandular swellings. The disease was therefore an epidemic of paludal pernicious fever of a typhoid type, accompanied frequently with glandular swellings or adenitis. These fevers I have named, *non-contagious lotmoïde typhus*, wishing to express by this formula that the epidemic had truly derived some symptoms from oriental plague and from typhus, but that it did not belong to either one or the other of these diseases, and that it was not transmitted by contagion."

One cannot read the accounts of the epidemics of Hindié and of Benghasi without being struck with the many features they have in common. They neither, apparently, were contagious, but while Dr. Barozzi puts prominently forward this character of the plague of Benghasi as an argument in favour of the non-contagion of the plague generally, Dr. Naranzi concludes that the disease of Hindié is not the plague because it is not contagious. The non-contagious nature of the disease in each case rests upon the same argument, as the comparison of the following passages will show :—

Dr. Naranzi says :—"An entire family affected with the disease went and settled near a tribe where the epidemic had not appeared; four members of this family died after its arrival in this tribe, which nevertheless did not contract the disease, but continued to enjoy the most perfect sanitary state."

We read in Dr. Barozzi's report :—"The imaret of Faouya is a small village of tents and houses. It is much frequented as the burial place of a marabout; and also on account of its traditional hospitality; it also possesses an excellent well of sweet water; the refuge was always open to travellers even during the epidemic; among those who lodged there in 1858, there were three with buboes, and two of them died rapidly, yet the imaret was completely spared by the epidemic."

Dr. Naranzi's report has elicited severe criticism from Dr. Tholozan, formerly of the French army, now resident at Teheran as physician to the Shah of Persia.* After quoting from Dr. Naranzi's pamphlet the reports of Dr. Duthieul, sanitary officer at

* "Une Epidémie de Peste en Mesopotamie en 1867," par le Dr. Tholozan, membre correspondant de l'Académie de Médecine de Paris. Paris, Victor Masson, 1869.

Bagdad, to show that ever since 1856 there had prevailed in the district "a dangerous fever, simulating typhoid, of adynamic type, accompanied with glandular swellings in the neck, the parotids, the axilla, and elsewhere," which had, not without reason, several times suggested the idea of the plague, Dr. Tholozan proceeds to examine the new facts collected in the pamphlet. The evidence of the Arab sheikhs, already condensed, points clearly to the nature of the epidemic, and it must not be lost sight of that "the Arabs who, like all other populations, have no liking for sanitary cordons, are disposed to diminish rather than exaggerate the evil; moreover, having no doctors among them, they would only notice the principal symptoms. Their ignorance or their suspicions fully explain the difference in their depositions before Dr. Naranzi, and before the Bagdad commission three months previously . . . The four observations collected by the Bagdad commission relate certain very important symptoms not mentioned in the evidence of the sheikhs, namely, *gangrene* in one case, *delirium* in two cases, *stupor* and *prostration* once, *red eyes* in two cases, fuliginosities of the teeth in two cases, constipation twice, vomiting once. Independently of this I find in a note, that the symptoms described by the sheikhs to the Bagdad commission before they thought themselves threatened by a sanitary cordon were *delirium, coma, loss of speech, hæmorrhage, vomiting, constipation or diarrhœa, ardent thirst, black tongue;* the skin became covered with *carbuncles, anthrax,* and *petechiæ* some hours before death. It is true the sheikhs examined afterwards by Dr. Naranzi, did not repeat the same story, and obstinately refused to mention any other symptom but fever and buboes, and that the number of deaths singularly varied in the various depositions. But I have already pointed to the cause of these variations, the fear of quarantine."

"You may blame the Bagdad Commissioners for not collecting a larger number of facts, for not having analysed more carefully the only two cases which came under their own observation; but is it fair to charge them with an error of diagnosis, when all the symptoms in these observations combine to show that the disease of Hindié is a very dangerous fever with marked cerebral symptoms, delirium, coma, stupor, and with buboes, carbuncles, anthrax, and petechiæ, etc." Dr. Naranzi asks, "if it is necessary by a minute analysis to show that the symptomatology of these cases proves rather the pernicious nature of the fever which is the foundation of or rather the disease itself in all that is essential." Certainly the symptoms show the pernicious nature of the fever, and the fever is, if you like, the foundation of or rather the disease

itself in all that is essential. But then the disease must be characterised, and hence the enumeration of the symptoms, delirium, stupor, etc.

"The first case is one of dysentery which on the second day is accompanied with fever, frequent rigors and copious perspirations; when the fever sets in, the bloody evacuations cease, and a gangrenous patch appears on the arm. Notwithstanding the presence of this gangrene, measuring four inches in diameter, and the continuity of the fever, Dr. Naranzi does not hesitate to say that this first case is evidently one of paludal fever of a dysenteric type.

"The second case, more marked still than the first by fever, delirium, fuliginosities, red eyes, inguinal bubo, is for Dr. Naranzi only 'a case of pernicious fever of typhoid type accompanied by morbid manifestations in the ganglionic system.' . . . . What is a pernicious fever of typhoid type accompanied by morbid manifestations in the ganglionic system? Is this form of disease described in pathology under any other name than the plague? . . .

"The third and fourth cases of the Commission are appreciated in the same manner, and I am sorry to say with the same partiality. . . . . In the interpretation of the third case, the tubercular or scrofular foundation, as well as the paludal fever, is a pure hypothesis. . . . As for the fourth case. . . . . I believe most readers will see in it something besides an inflamed hernia." . . . .

After the most careful critical examination of all the facts and of Dr. Naranzi's argument, Dr. Tholozan says:—"The conclusions adopted at Constantinople are not mine. The superior sanitary council does not believe in the plague: I am convinced of it, on the contrary, from the foregoing analysis of all the published facts. . . . We face a question more important than is perhaps imagined. We must have a clear and precise solution. . . . . It must be known that the sanitary measures proposed by the Bagdad commission were applied only at the end of the epidemic of Hindié, three months after its appearance. I ask, if the epidemic had found in the neighbouring towns of Hillé, Nedjef, and Kerbela, those local predisposing causes which are indispensable to the development of an epidemic; if the spark of contagion had lit up there, would it have been possible to stop the fire? I think not. Then, in this melancholy supposition, we should have seen in a short time all Turkey in Asia invaded by the plague, and the European shores of the Mediterranean and the Black Sea threatened with the disease. . . .

"As the facts observed since 1856 by Dr. Duthieul in Irak Arabi are true, as the epidemic among certain portions of the

tribe of Beni Taraf in 1867, is a fact proven by two enquiries, I am convinced that similar facts may be speedily renewed. Let them be described in all their details. . . . It will be rendering science a signal service to definitely fix opinion, by new examples, on one of the most curious and most important points of pathology, *sporadic plague, localised epidemics of plague, benign plague.* Sanitary measures would follow, or be adopted at the same time. . . . . The essential in sanitary or restrictive measures is to employ them in time. . . ."

The epidemics of Benghasi and Hindié present remarkable features in common; in each case a deadly epidemic, the plague, generally considered the most contagious of diseases, slowly develops itself, its period of increase apparently extending over several years; it attains great intensity, and causes a considerable mortality. During its prevalence, the infected districts communicate freely with the neighbourhood, very tardy measures of sequestration being adopted, in Hindié especially; yet the epidemic does not spread beyond the limits of its origin, and there too, after a while, it loses its strength and dies out; it shows no contagious character. Dr. Barozzi, at Benghasi, openly proclaims the inutility of quarantine, and Dr. Tholozan, of Teheran, speaks very doubtfully of its efficacy: — "While I admit, in the present case," says the latter, "restrictive measures, such as sanitary cordons, if the authorities have the power of establishing them, and the populations will tolerate them, I approve especially and in preference, prophylactic measures calculated to improve the hygienic condition of the population, and especially of its food."* By a curious contrast, quarantine in all its severity has recently been diverted in another direction, which for a time has rallied all the forces of the contagionist camp.

CHOLERA had not existed in the Mediterranean since the Crimean war. In 1865 it suddenly broke out in Egypt, and soon after it appeared in Constantinople and elsewhere. Dr. Mühlig, principal medical officer of the Imperial Naval Hospital, gives the following account of its outbreak:†—"Since several weeks we know that an epidemic of cholera prevailed in Alexandria; we also know that it had been brought there by the pilgrims from Mekka. The population, panic-stricken, had begun to emigrate on a large scale, and, soon, single cases of cholera were observed wherever the tide

* Tholozan, *loco citato*, p. 74.
† Gazette Médicale d'Or., tom. ix., p. 65.

stopped, as at Beyrout, Smyrna, Chio. Up to the 28th of June there was no talk in Constantinople of any case of cholera, or of any premonitory disease, as diarrhœa, sporadic cholera, or any form of gastro-intestinal disease. On this memorable day, for on the 28th June, 1865, began the present epidemic in Constantinople, there arrived from Alexandria, in a direct voyage, the Ottoman frigate "Moukbiri-sourour:"the captain having declared no deaths during the voyage, nor any sickness among his crew, the ship was immediately admitted to free *pratique*. However this may be, on the evening of the same day twelve sick sailors were discharged into the naval hospital, and the doctors ascertained at once that eleven were cases of cholerine, and the twelfth, a case of algide cholera, terminating fatally during the night. The surgeon of the ship, examined by the medical officers of the hospital, declared that between the Dardanelles and Constantinople two of the crew had died of cholera, that in Alexandria there had been no cases of cholera on board, but that there had been cases of diarrhœa. On the 30th, nine other sailors from the same ship were sent into the hospital, and two of them showed well-marked cholera symptoms."

There seems to be no reason to doubt that these cases from the frigate "Moukbiri-sourour" were the first of the epidemic of 1865 in the capital; and an attempt has been made by Dr. Mühlig and others to trace the filiation of subsequent cases to these first.* Great stress is laid on the circumstance that the next case observed in the naval hospital on the 5th July, is that of a military artizan admitted into hospital on the 3rd July, from a barrack situated opposite the wharf where the first patients landed; but this barrack is fully 300 yards from the landing-place, and it is not shown that this artizan held any communication whatever with the sick landed from the frigate. It is surmised, I presume, that such communication may have taken place. A similar supposition is all the evidence of filiation in all the other cases. Actual contact with the sick is never proved. Its possibility is barely shown, while the important fact is lost sight of, that the cases actually received into the naval hospital, and which were isolated only "so far as it is possible in a large hospital," did not generate the disease in the hospital. Each cholera case came into necessary contact with a number of individuals who, as a rule, got off scot free; while it was necessary to imagine a possible contact to explain by

* Mühlig, *loco citato*, and Mongeri, Etude sur le choléra qui a regné à Constantinople ("Gazette Méd. d'Or.," tom. ix., p. 132.)

contagion the spread of the disease, and yet the conclusion is that "*cholera is contagious, eminently contagious.*"

To oppose the progress of the epidemic, Dr. Mühlig says that "the most rational and most certain measure is, to prevent all communication with any place where cholera has appeared, by surrounding it with a cordon, as is practised for places infected by the plague; it is necessary to prevent general routes, emigrations, which carry death everywhere without any profit to the fugitives themselves, for they are always in the infection which they carry along with them. But as it is not always easy to maintain these cordons with the required rigour, all arrivals from places near the focus of the disease, and from the focus itself, must be submitted to a rigorous quarantine of twenty-five days at least. In this respect, the following principles should be a guide:—

1.—Quarantine to be performed far from towns, especially far from populous centres,—as much as possible in islands.

2.—It must never be tolerated that passengers perform their quarantine on board ships.

3.—Lazarettos, both spacious and isolated, to be established in those places selected as convenient.

4.—Each lazaretto to have a hospital completely detached from the principal building.

5.—Sanitary doctors attached to the lazarettos in number corresponding to the importance of the station and to circumstances, to observe day by day the inmates of the lazaretto; reliable assistants remaining constantly in the immediate vicinity of inmates to complete, by their reports, the doctors' observations.

6.—If a case of cholera occurs in a ship, the crew to be landed and admitted to the lazaretto, and those among them suffering from diarrhœa, to be sent to the hospital. The ship to be submitted to thorough purification, as obtains with ships infected with yellow fever. On taking on board the crew after twenty-five days, the ship to remain in observation during fifteen days more, the sanitary doctors vigilantly watching it in the mean time.

7.—Linen and clothes used by cholera patients during their illness (naturally also those used by sufferers from choleriform diarrhœa) to be destroyed; the hospital where cholera patients have lain, to be purified.

8.—Any communication with the lazarettos and ships in quarantine to be strictly prohibited, and infraction of quarantine laws to be punished with the utmost severity.

It was a notorious fact that cholera had spread over the Mediterranean notwithstanding any existing quarantine measures, and

nevertheless the theory that such measures could stop its progress was generally maintained by the quarantine authorities, which, claiming a signal victory over the plague, would not allow themselves to be beaten by what had hitherto been considered a less formidable enemy. At the instigation of its sanitary officers, who had taken, since 1851, a prominent part in the administration of the quarantine in Turkey, the French Government promoted the meeting at Constantinople of an international conference, "to enquire into the primordial causes of cholera, to study its character and progress, to determine its principal starting points, and, in fine, to propose the practicable means of circumscribing and extinguishing it at its origin."*

The conference met on the 13th of February, 1866. The following States were represented by the first secretary of their respective missions to the Porte, and by one or more medical delegates :—Austria, Spain, Great Britain, Greece, Italy, Holland, Persia, Portugal, Prussia, Russia, Sweden, and Norway; France sent a special diplomatic commissioner, M. le Comte de Lallemand; Belgium and Holland appointed no medical delegate; the Papal States were represented by an Archbishop and a medical delegate; the Porte's representatives were Salih Effendi, Director of the Imperial School of Medicine, the President of the Conference, and Dr. Bartoletti, Inspector-General of the Sanitary Service; Egypt sent a medical delegate, Salem-bey. The conference was attended by sixteen diplomats and twenty-one doctors. Each State had two votes, provided it had sent two representatives; where there were more than two for one State, they could all take a part in the debate, but only two could vote.

Dr. Fauvel, for some years French delegate at the Superior Council of Health of Constantinople, who had been the principal instigator of the conference, was the French medical delegate; he took the most prominent part in its operations, he was the leader of its debates, and its historian at its close. He came to the conference with the foregone conclusion that cholera originated on the banks of the Ganges, whence, spreading by contagion, it was carried by the Mahometan pilgrims of India to Mekka, and from Mekka through Egypt to the Mediterranean ports and the rest of the world. He had impressed his views on the French Government, and the convocation of the conference had no other object than to promulgate them with authority, and carry them to their practical consequences Similar views we have already seen were held by

* Circular despatch of M. Drouyn de Lhuys, in Fauvel's "Le Cholera," etc. Paris: J. B. Baillère, 1868.

Dr. Mühlig, who represented Prussia at the conference, and by his consummate ability strongly supported the French views. The delegates of the minor Mediterranean powers merely followed in the wake of the French leaders, who thus carried all their points with a large majority, and rewarded their followers in the end by a liberal distribution of ribands of the Legion of Honour.

The attitude of the conference shewed itself from the very first meeting, when the French delegates urgently demanded, that in the event of cholera breaking out again among the pilgrims then about to assemble at Mekka, all communication by sea between the Arabian ports and the shores of Egypt should be at once interrupted.

There could not be a greater *petitio principis;* the conference was asked to take for granted all those questions it had assembled to investigate. The British Commissioner, Mr. Stuart, in vain attempted to lead the assembly from a premature expression of opinion to the impartial study of its objects, but notwithstanding his protest, the French proposal was taken into consideration and carried by a large majority. From this time he took no active part in the debates of the conference, and he left Constantinople before the conclusion of its labours. The British medical delegates to the conference, Dr. Goodeve, late of the Indian service, and now of Clifton, and Dr. Dickson, Physician to the Embassy, were no match for the French, and all they were able to effect was to modify slightly, in some points of detail, the proposals of the French Commissioners.

After holding forty-four meetings, besides numerous meetings in committee, and listening to several elaborate reports, the conference adopted the following propositions, which are the conclusions of an elaborate report by Dr. Fauvel :—

Origin and Genesis of Cholera; Endemicity and Epidemicity of the Disease in India.

1. Asiatic cholera, which several times has overrun the world, has its origin in India, where it first appeared, and where it exists permanently in an endemic state.

2. Invading Asiatic cholera has never been developed spontaneously, and has never been observed as an endemic in any of the countries here enumerated (Europe, the Caucasian provinces, Turkey in Asia, Northern Africa, North and South America); it has always been imported from without. As for those countries which adjoin India, while admitting as probable that cholera does

not exist there as an endemic, the conference does not feel authorised to come to any formal conclusions in this respect.

3. The conference, without rejecting the possibility that cholera may become acclimatised in our countries, considers this fact problematical.

4. Asiatic cholera does not appear to have in Hedjaz any original focus; it seems hitherto to have been always imported there from without.

5. There are in India certain localities, comprised principally in the valley of the Ganges, where cholera is endemic, without its being possible to designate precisely all such, or to affirm that they enjoy the exclusive privilege of giving birth to the disease.

6. We do not know the special conditions under the influence of which cholera is bred in India, and reigns there in certain localities in the endemic state.

7. Pilgrimages are in India the most potent of all the causes which contribute to the development and propagation of epidemics of cholera.

Transmissibility and Propagation of Cholera.

8. Cholera is propagated by man with a rapidity all the greater, as his own migrations have increased in activity and become more rapid.

9. The transmissibility of Asiatic cholera is an incontestible verity proved by facts which admit of no other interpretation.

10. No fact has proved hitherto that cholera can be propagated at a distance by the atmosphere alone, whatever its condition; and moreover, it is a law without any exception, that an epidemic of cholera has never been propagated from one point to another in a time shorter than is necessary to the transport of man himself.

Mode of Importation of Cholera and Agents of its Transmission.

11. Man affected with cholera is himself the principal propagating agent of the disease, and one single cholera case may give rise to the development of an epidemic.

12. Certain facts show that a single individual (and *a fortiori* several) coming from an infected place, and suffering from diarrhœa, may suffice to produce the development of an epidemic of cholera, or, in other words, that the premonitory diarrhœa may transmit cholera.

Duration of Incubation.

13. In almost every case, the period of incubation, that is, the time lapsed between the moment when any individual may have absorbed the cholera poison and the appearance of premonitory diarrhœa, or of confirmed cholera, does not exceed a few days. All the facts quoted of a longer incubation belong to cases which are not conclusive, either because the premonitory diarrhœa has been included in the period of incubation, or because contamination may have occurred after leaving the infected place.

14. There is no known fact which proves that cholera has been imported by living lower-animals; but it is reasonable nevertheless to consider them, in some cases, as belonging to the class called susceptible.

15. Cholera may be transmitted by personal effects coming from an infected locality, and especially if they have been used by cholera patients; moreover, it results from certain facts that the disease may be exported to a distance by these same effects shut off from all contact with the external air.

16. Although there are no proofs of the transmission of the disease by merchandise, its possibility in certain conditions is admitted.

17. It will be wise to consider as suspicious, except under special and determined conditions, everything coming from a choleraic centre.

18. Although there are no conclusive facts to show that the dead bodies of cholera patients have transmitted cholera, it is prudent to consider them dangerous.

Influence of means of Communication.

19. Communications by sea are by their nature the most dangerous; they convey cholera to a distance with the greatest certainty. Next are railways, which in a very short time may carry the disease a long way.

20. Great deserts are an efficacious barrier to the propagation of cholera, and there is no example of the disease having been imported to Egypt or Syria, across the desert, by caravans leaving Mekka.

Influence of Agglomerations.

21. Every agglomeration of men, where cholera has penetrated, is a favourable condition to the rapid extension of the disease;

and, if this agglomeration is in bad hygienic conditions, to the violence of the epidemic.

22. The rapidity of its extension is proportionate to the concentration of the agglomerated mass, while the violence of the epidemic, *cæteris paribus*, is all the more marked if the individuals composing the agglomeration have suffered but little from the choleraic influence, or have been quite exempt from it; *i.e.*, in other words, individuals having already been subject to the influence of an epidemic focus enjoy a sort of relative and temporary immunity which counterbalances the evil effects of the agglomeration.

23. In an agglomeration, the more rapid the extension of cholera, the quicker also it ceases, unless new and healthy arrivals come to supply a new aliment and feed the epidemic.

24. The intensity of cholera epidemics in crowded ships is generally in proportion to the crowding, and is all the more violent, *cæteris paribus*, if the inmates of the ships have not left a cholera focus where they had been dwelling; in crowded ships, the progress of cholera is usually rapid. The danger of importation by ships and that of causing a severe epidemic are not entirely subordinate to the intensity, nor, indeed, to the existence of choleraic casualties on board during the voyage.

25. The agglomeration of individuals coming from a locality where cholera prevails in a lazaretto has not the effect of producing among them a great extension of the disease, but such an agglomeration is, nevertheless, very dangerous to the neighbourhood, and liable to favour the propagation of cholera.

26. Great agglomerations (armies, fairs, pilgrimages) are among the surest ways of propagating cholera; they form great epidemic foci, which, whether they march in the manner of armies, or are disseminated, like fairs and pilgrimages, import the disease into the countries they traverse; such agglomerations ordinarily undergo rapidly the influence of cholera, then become much less sensitive to its influence, which even disappears pretty quickly, unless new arrivals come to feed the disease.

27. The dispersion of an agglomerated mass, opportunely effected, may diminish the violence of an epidemic of cholera which has broken out in it, and may even check its progress; but this dispersion would, on the other hand, create a great danger of propagation if effected in localities still free.

28. The pilgrimage of Mekka has led to the importation of cholera in Egypt twice in thirty-four years, during the hot season.

Influence of Hygienic Conditions.

29. The hygienic and other conditions which in general predispose a population to contract cholera, and consequently favour the intensity of epidemics, are poverty and all its consequences, the accumulation of individuals, their state of ill-health, hot seasons, defective ventilation, exhalation from a porous soil impregnated with organic matter, especially if proceeding from cholera dejections.

30. Experience showing that cholera dejections contain the germs of cholera, it is legitimate to allow that sewers, water-closets, and the polluted water of a town may become propagating agents of the disease.

31. It apparently results from certain facts that the soil, once impregnated with cholera detritus, retains for a tolerably long time the property of throwing out the germs of the disease, and keeping up an epidemic, and even reproducing it after it has ceased.

Immunity from Cholera.

32. The immunity from cholera enjoyed by certain localities—*i.e.*, the resistance, permanent or temporary, general or partial, of these localities—to the development of cholera within their limits, is a fact which does not exclude its transmissibility, but only shows that certain local conditions, hitherto undetermined, are an obstacle to the development of the disease.

33. In the same way the immunity, more or less complete, more or less enduring, enjoyed by the great majority of those who are placed in the middle of a cholera focus—an immunity attesting the resistance of the individual to the toxic principle—is a circumstance to be taken into the greatest consideration.

34. As regards epidemic development, it is the corrective of transmissibility; and as regards prophylaxis, it leads the way to appropriate means of restricting the ravages of the disease.

Conclusions relating to the Attributes of the Generating Principle of Cholera.

35. In the present state of science, hypotheses alone can be suggested on the nature of the generating principle of cholera; all we know is, that it originates in certain countries in India, and holds its ground there permanently; it originates itself in man, and accompanies him in his peregrinations; it can thus be propagated far away, and from place to place, by successive regenerations,

without ever reproducing itself spontaneously without the human organism.

36. The atmospheric air is the chief vehicle of the generating agent of cholera; but the transmission of the disease by the atmosphere is, in the majority of cases, limited to a distance very near to the centre of emission. As for the alleged cases of transport by the atmosphere to a distance of one or more miles, they are not sufficiently conclusive.

37. Water, and certain ingesta, may also become vehicles for the introduction into the economy of the generating principle of cholera.

38. It follows that the channels by which the toxic agent penetrates the economy are chiefly the respiratory and, very probably also, the digestive organs. Its penetration through the cutaneous surface is not proved in any way.

39. The excreted matter in cholera being, without doubt, the principal medium of the morbific agent, it follows that everything that has been contaminated by these *excreta* becomes also a medium whence the generating principle of cholera may free itself under the influence of favourable conditions; it follows also that the genesis of the cholera germs takes place probably in the digestive organs, to the exclusion, perhaps, of every other organic system.

40. It results from a study of the facts, that in the open air the generating principle of cholera loses rapidly its morbific activity, and this is the rule; but in certain conditions of confinement, this activity may be retained for an indefinite time.

41. Observation shows that the duration of the diarrhœa of cholera, known as premonitory—which must not be confounded with every diarrhœa existing in a cholera season—does not exceed a few days.

42. The exceptional facts cited do not prove those cases of diarrhœa which are prolonged over this period to belong to cholera, and to be capable of transmitting the disease, when the individual affected has been removed from all contaminating causes.

As a consequence of these principles, the conference proposed to the European powers a system of measures for the prevention and suppression of cholera epidemics. No exception can be taken to the wisdom and utility of the hygienic measures on sea and land proposed by the conference.* They are general in their

* Procès-verbaux de la Conférence Sanitaire Internationale.
Montau—Rapport sur les mesures d'hygiène à prendre pour la préservation contre le Choléra Asiatique.
Mühlig—Rapport sur la désinfection appliquée au Choléra.
Lenz—Mesures d'hygiène navale relatives à la prophylaxie du Choléra (Annexes au procès-verbaux des 24e et 28e séances).

character, and have long since been recommended for promoting the salubrity of ships, waters, towns, and staying the ravages of disease generally. But at the same time the conference drew up a programme of restrictive measures, being the conclusions of a second report by Dr. Fauvel, "Des mesures à prendre en Orient pour prévenir de nouvelles invasions du Choléra en Europe," and although the efficacy of these measures remains to be proved by subsequent experience, it is interesting to reproduce them here, as they are the natural development of the conclusions previously laid down.*

1. Restrictive measures known beforehand and properly applied are much less prejudicial to commerce and international relations than the perturbation of industry and commercial transactions which follows an invasion of cholera.

2. Quarantine and other prophylactic measures against cholera, the nearer they are applied to the original focus of the disease the less onerous they will be, and the greater their efficacy (admitting always a proper application) in preserving Europe.

MEASURES FOR INDIA.

3. It is not impossible to extinguish invading cholera in India, or, at all events, to limit its epidemic development. To attain this double object, a careful study is necessary of the special conditions which cause and perpetuate endemic cholera, and of the existing relations between the endemic disease and its epidemic outbreaks, and at the same time, the prosecution of the hygienic ameliorations already commenced.

4. To counteract the influence of Indian pilgrimages on the development of cholera—1st. Limit the number of pilgrims by obliging them, if possible, to procure, before starting, a permit, to be delivered to those only who can prove that they have the means of providing for their wants during the journey; 2nd. Establish in all places of pilgrimage a sanitary police understanding the application of the hygienic measures already in practice and completed according to the dictates of experience; 3rd. In the event of cholera among the pilgrims, when practicable, authorise the return of the infected multitude only after the complete cessation of the epidemic and a general disinfection.

5. It is of the utmost importance to endeavour to prevent the exportation by sea of cholera from India. The Native Passenger

* Procès-verbaux de la Conférence Sanitaire Internationale. Annexe au procès-verbal N° 29. Reluée des conclusions adoptées par la Conférence. Annexe au procès-verbal, N° 44, p. 16, *et seq.*

Act, 1858, would be a principal means of attaining this object if applied to all flags and in all countries, and if supplemented by sanitary precautions. Moreover, every ship leaving an Indian port should be furnished with a bill of health delivered by a sanitary authority instituted *ad hoc*, and charged at the same time to watch over the execution of the regulations relating to the embarkation of pilgrims. Further, in the event of an epidemic in some point of India, to suppress, to postpone, or to restrict, if possible, the embarkation of pilgrims from that point; and lastly, like the Dutch Government in its Indian possessions, the Indian Government to require from each Mussulman pilgrim the proof that he has the means of providing for the expenses of his journey and the maintenance of his family during his absence.

Measures for the Intervening Countries between Europe and India.

6. The formation at the entrance of the Red Sea of a sanitary establishment; international in its character; the governments interested to agree on the form and extent of the intervention of each; the Porte or the Egyptian Government to be charged with its direction under the control and with the assistance of Europe; sanitary measures to be applied in virtue of international regulations, specifying cases, by an authority under the control of the interested governments.

7. The sanitary service in the Red Sea to consist of—Three medical stations on the African coast, at Koseir, Souakin and Massowah, and two on the Arabian coast, Djeddah and Yambo; two lazarettos, one at El-Wesch for the exclusive use of pilgrims; another at Tor for ordinary arrivals affected with cholera; a direction at Suez, to decide, with the assistance of an international commission, all questions relating to the sanitary service in the Red Sea.

8. The departure of the pilgrims to be subjected to supervision and precautions.

9. Hygienic measures to be put in practice in the places of pilgrimage.

10. There is no dependence on quarantine measures in the Hedjaz as a check to the importation of cholera by the pilgrims.

11. In the event of cholera appearing in the Hedjaz at the time of the pilgrimage, to interrupt temporarily, that is during the duration of the epidemic, all communication by sea between the Arabian ports and the shores of Egypt. A sanitary service and a

sufficient military and naval force having been previously provided for the purpose, this interruption to take effect as follows, subject to any alterations of details, *not affecting the fundamental principle*, judged necessary by the Suez International Sanitary Commission: —1st. On the appearance of cholera among the pilgrims, the sanitary officers in the Hedjaz to notify the fact to the local authorities and to the vessels of war stationed at Djeddah and Yambo, to enter it on all bills of health, and also to communicate it to Egypt and El-Wesch; 2nd. On receipt of this declaration from the sanitary officers in the Hedjaz, the authorities to inform the pilgrims, that should they wish to embark for Egypt, they must in the first instance perform quarantine at El-Wesch, but that they are free to leave overland; 3rd. The embarkation to take place under the supervision of the military authorities, on conditions determined by them, and at ports designated for the purpose; 4th. Ships of war to assist in enforcing the measures ordered, to maintain the police of the sea, to keep a close watch and prevent any clandestine departure; 5th. On receiving intelligence of the presence of cholera among the pilgrims, the Egyptian authorities to close the entry of all Egyptian ports to all arrivals from the Arabian coast, to turn back all ships contravening, after victualing them if necessary, to some point of the Arabian coast, to El-Wesch or elsewhere, there to perform quarantine according to the rules laid down; 6th. The pilgrims transported to El-Wesch to be kept there in quarantine, and to be authorised to proceed to Egypt only fifteen full days after the disappearance of cholera from among them, and after the disinfection of their clothes and luggage; on leaving El-Wesch, the ships with pilgrims bound for Suez to call at Tor, to remain there under observation twenty-four hours, and undergo a medical visit to ascertain their sanitary condition; a clean bill of health and permission to continue the journey to be given only in the event of the sanitary state on board being recognised as free from danger; 7th. The caravan for Egypt to stop according to custom at its ordinary station near El-Wesch, there to undergo medical inspection, and to be allowed to proceed on its journey only after having been free from cholera fifteen days; 8th. The pilgrims for India or other countries beyond the Red Sea to be allowed to embark on their return journey, subject to the rules prescribed by the sanitary authorities at the port of embarkation; 9th. Communications by sea between the Hedjaz and Egypt to be re-established, only, fifteen days at least after the cessation of all signs of cholera in the Hedjaz, officially declared by the sanitary authorities at Djeddah; but then, and indeed at

all times, ships carrying pilgrims bound for Suez to call at Tor, and remain there twenty-four hours for medical inspection as above. The sanitary authorities at Suez to have the power to send back to Tor any ship not fulfilling this formality; 10th. Regulations concerning penalties for all infractions to the prescribed measures to be drawn up by the international commission. The Native Passengers Act, India, 1858, to be in this respect a recognised guide.

12. In the event of cholera coming from the Red Sea appearing in Egypt, Europe and Turkey being free, all communications by sea between Egypt and the Mediterranean to be interrupted temporarily.

To guard against importations of cholera overland from India, sanitary bulwarks of a like nature to be erected in Persia, on the Turco-Persian frontier, on the Bokhara and Tartary frontier of Russia, and on the Russo-Persian frontier.

To complete the system, a perfect code of quarantine regulations entering into the minutest details of construction and management of lazarettos, of maintenance of sanitary cordons, &c., &c., was drawn up by Dr. Bartoletti, of the Superior Council of Health of Constantinople, and adopted by the conference.*

Of the recommendations of the conference, those referring to the improvement of the sanitary condition of Djeddah, Mekka, and Medina, are said to have been carried out; but any one familiar with the manner in which sanitary questions are usually handled by the authorities in Eastern cities, will be necessarily sceptical on this subject,—also, steps have been taken towards the formation of a sanitary station at the entrance of the Red Sea. A commission was sent there last summer, consisting of Drs. Watrin, Millingen, junr., and Arif Bey, to select a suitable site for such a station, and in their report† they have recommended two places as offering the requisite conditions, Nedjdaha and Sheikh-Said; the latter place being opposite the Isle of Perim; in the mean time, Dr. Millingen, junr., has been stationed as an advanced sentry on the Isle of Perim to watch for cholera and interrogate visitors as they pass. But the pilgrims from India have passed through to Mekka and Medina every year since 1865, and no cholera has broken out among them; and, as if to baffle all sanitary calculations, this year cholera has threatened Constantinople from the north. It prevailed in South

* Bartoletti, Rapport sur les mesures quarantinaires applicables aux provenances cholériques. Annexé au procès-verbal, No. 37.

† Rapport de la Commission Sanitaire chargée de l'exploration de la Mer Rouge. "Gaz. Méd. d'Or," Août et Septembre, 1870.

Russia, on the shores of the Caspian, and there were cases at Taganrok, Kertch, and Odessa; all ships coming from Russia were immediately subjected to ten days' quarantine at the entrance of the Bosphorus, but before this quarantine had been enforced, one case had been landed and taken to an hotel in Galata, where it ended fatally, without however becoming the nucleus of any others.

While on the subject of cholera, two contributions to its history in the East would deserve mention at greater length than the space at my disposal permits.

Dr. S. Zennaro* has published an exhaustive treatise on cholera, travelling over nearly the same ground as the reporters to the International Conference, and very generally coinciding with them in his conclusions; his work contains interesting researches on the origin of cholera in India, on its several appearances in Europe, and on the local peculiarities of the epidemic of 1865 in Constantinople.

While cholera was still raging in 1865, the Imperial Society of Medicine had offered a prize to the author of the best description of the epidemic in any locality of the Ottoman Empire, and this prize was awarded to an essay on the invasion and propagation of cholera in Smyrna, by William Chanaud, M.D., an able physician practising in that town.†

The Imperial Society of Medicine, shortly after its foundation, had, for the purpose of encouraging medical research on subjects specially connected with Turkey, instituted prizes, to be awarded to the authors of the best essays on specified subjects; to this measure are due several interesting contributions to medical literature in the East, all of which have appeared in the columns of the "Gazette Médicale d'Orient," and some of which have also been published separately. The first subject proposed was, "La topographie médicale d'une localité ou d'une circonscription quelconque plus ou moins étendue, de l'Empire Ottoman," and the Society received in reply essays on the Medical Topography of Lower Albania,‡ of the Isle of Soulina (Delta of the Danube),§ of

* Zennaro: Etude sur le choléra à l'occasion de l'épidémie de Constantinople en 1865. Constantinople, 1870.

† Chanaud: Invasion et mode de propagation du choléra, étudié à Smirne. "Gaz. Méd. d'Or.," 1870-71.

‡ Topographie médicale du littoral de les Basse-Albanie, comprenant la juridiction sanitaire de Valona, par le Dr. Laval. Prix de la Société Impériale de Médicine de Constantinople. Constantinople, 1869.

§ Topographie médicale de l'Ile de Soulina (Delta du Danube), par le Dr. Salamo. "Gaz. Méd. d'Or." Août, *et seq.*, 1859.

Smyrna,* and of the town of Derna (Barbary);† which all contain reliable information on almost everything of interest in the science of medicine in these localities.

Leprosy, which is endemic in several parts of the Ottoman Empire, especially in oil-growing districts, was proposed as a subject for a prize essay in 1864; the Society's programme required:—1. An exact description of leprosy as it occurs in certain districts of the Ottoman Empire; its characteristic symptoms, varieties, special and differential diagnosis, and as far as possible a comparison between Oriental leprosy and that observed in other countries, and also between leprosy in the present day and that described by the ancients. 2. Occasional and predisposing causes; physical and hygienic condition of the districts; manners and customs of the populations of different races; relations, if any, between leprosy and special cutaneous affections endemic in the country. 3. Pathological and post-mortem appearances. 4. Transmissibility of leprosy by contagion or inheritance. 5. Prophylaxis and treatment.

A description of leprosy in the Island of Crete‡ obtained the prize.

In this manner the Society has endeavoured to direct the labours of its members, and of the medical body throughout Turkey to the study of all those medical questions which find a practical illustration in the circumstances of the country, and for the solution of which the country affords special and important elements. But its activity has not been spent exclusively on such matters of mere local interest; at its fortnightly meetings papers on very varied topics have been read and discussed, and the fourteen volumes of the "Gazette Médicale," already published, form a most interesting and instructive collection. Anyone looking over these volumes must admit that the Society has established the claims of scientific medicine in the Ottoman Empire, and thus materially contributed to its progress. Space will not allow me at present to review even cursorily a number of papers and observations in every branch of medicine and surgery contributed to those volumes; but many of them deserve to be given a wider publicity than that of a local Gazette, and an opportunity of doing so may perhaps be offered another year.

* Topographie médicale de Smyrne, par le Dr. Wm. Chanaud. "Gaz. Méd. d'Or.," 1859-60.

† Topographie médicale de la ville de Derna (Ancienne Cyrénaïque), par le Dr. Laval. "Gaz. Méd. d'Or.," 1860.

‡ "Gaz. Méd. d'Or.," 1864-65, p. 6, *et seq.*

Dr. Wahltuch has furnished the following notice of the work referred to, p. 567.—(Ed.):—

"Dr. Zennaro divides his work into three parts: 1, Historical; 2, Scientific; 3, Prophylactic; each of which is treated in much detail.

"The therapeutical remarks deserve our special notice. According to his views and experience it is necessary to correct the infection or toxic effects in the human organism, as well as the toxic state of the atmosphere, by neutralising the choleraic element, by liquifying the blood and by raising the vital powers. He recommends chlorine inhalations in the form of fumigations, using equal parts of chloride of lime and chloride of sodium with nitric acid, to neutralise the poison within the organism, and also to disinfect everything about and near the patient. With the object of diluting the coagulated blood he thinks the best mode of proceeding is to inject into the veins pure water having the temperature of the healthy blood, and the internal administration of saturated mineral acidulated drinks; he also gives opiates and tannate of quinine. Aromatic vinegar combined with acetic or sulphuric acid and ice he uses externally as an embrocation for the skin, applied especially along the vertebral column and epigastrium. He considers cold baths to be of more service in raising the temperature than warm baths. As a prophylactic measure he strongly advocates the establishment of quarantines."

APPENDIX.

OPORTO (PORTUGAL). (See "REPORT," p. 123.)

DEAR DR. DOBELL, OPORTO, 1*st December*, 1870.

The Table of Meteorological Observations promised in my Report for 1869—70, was finished this morning by my friend Senhor Julio Kopke. They have been most carefully made, and I hope will reach you in time for publication.

Yours sincerely,

G. H. BRANDT.

YEAR.	BAROMETER.			THERMOMETER.			PSYCHROMETER.			RAIN.	OZONE.		
1869 and 1870.	Maximum.	Minimum.	Greatest Variation.	Maximum.	Minimum.	Greatest Variation.	Mean.	Maximum.	Minimum.	Greatest Variation.	Mean.	Total in Millimeters.	Maximum.	Minimum.	Mean.
December	770·3	748·1	22·2	15·3	0·3	15·0	7·8	98	52	46	75	241·7	16·5	3·5	10·0
January	773·5	756·1	17·4	16·2	0·2	16·0	8·2	97	47	50	75	115·6	17·5	4·5	11·0
February	770·2	741·2	29·0	18·2	2·2	16·0	10·2	97	73	24	85	190·6	16·0	4·0	10·0
March	765·2	747·8	17·4	25·3	3·3	22·0	14·3	94	40	54	67	117·8	16·0	4·0	10·0
April	768·9	754·5	14·4	30·4	6·2	25·2	17·8	88	32	56	60	28·4	13·0	2·0	7·5
May	766·2	759·0	7·2	33·1	6·3	26·8	19·7	96	44	52	70	18·8	14·0	4·0	9·0
June	767·3	759·1	8·2	36·2	13·4	22·8	24·8	88	32	56	60	0·0	11·0	1·0	6·0
July	765·1	754·9	10·2	39·4	13·4	26·0	26·4	88	38	50	63	2·4	11·5	1·5	6·5
August	764·4	754·4	10·0	32·4	13·4	19·0	22·9	89	41	48	65	52·8	12·0	3·0	7·5
September	766·5	757·3	9·2	28·4	11·2	17·2	19·8	90	64	26	77	92·8	11·5	1·5	6·5
October	772·6	755·8	16·8	26·0	7·0	19·0	16·5	93	63	30	78	176·5	13·5	1·5	7·5
November	765·4	744·2	21·2	23·0	3·2	19·8	13·1	98	48	50	73	432·2	14·5	1·5	8·0
December, January, and February				..	..	..	8·7	..	..	..	77	547·9	..	..	10·5
March, April, and May				..	..	..	17·3	..	..	..	66	165·0	..	..	9·0
June, July, and August				..	..	..	24·7	..	..	..	63	55·2	..	..	7·0
September, October, and November				..	..	..	16·5	..	..	..	76	701·5	..	..	7·5
Of the whole Year				..	..	..	16·8	..	..	..	70	1,469·6	..	..	8·5
			760·3												

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*** References to entire Reports and their Sections are printed in *italics*, and the names of their Authors in SMALL CAPITALS.

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